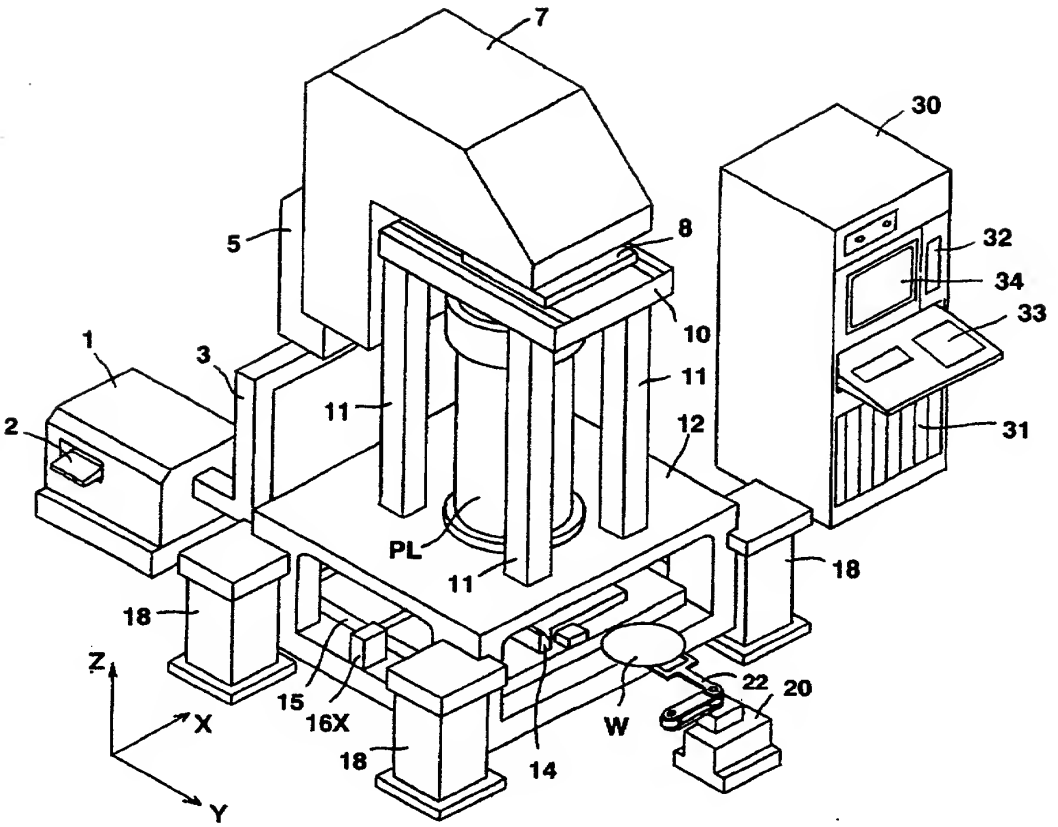
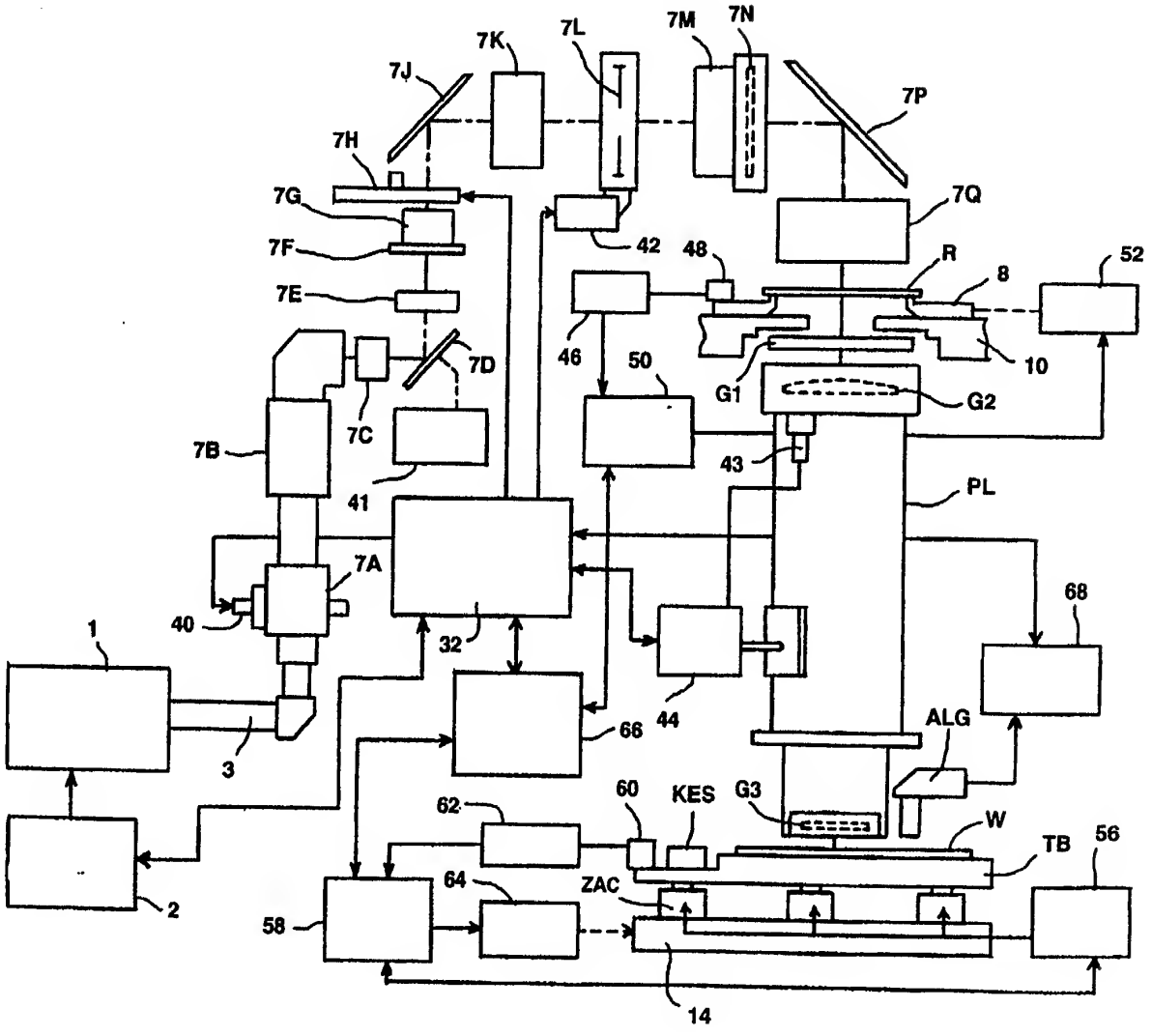


Fig. 1

Fig.2


7K
7L
7M
7N
7J
7P
7H
7G
7Q
7F
42
48
R
8
52
7E
46
50
G1
G2
10
7D
7C
7B
43
41
PL
7A
68
40
1
32
44
66
ALG
3
62
60
KES
G3
W
TB
56
64
ZAC
58
2
14

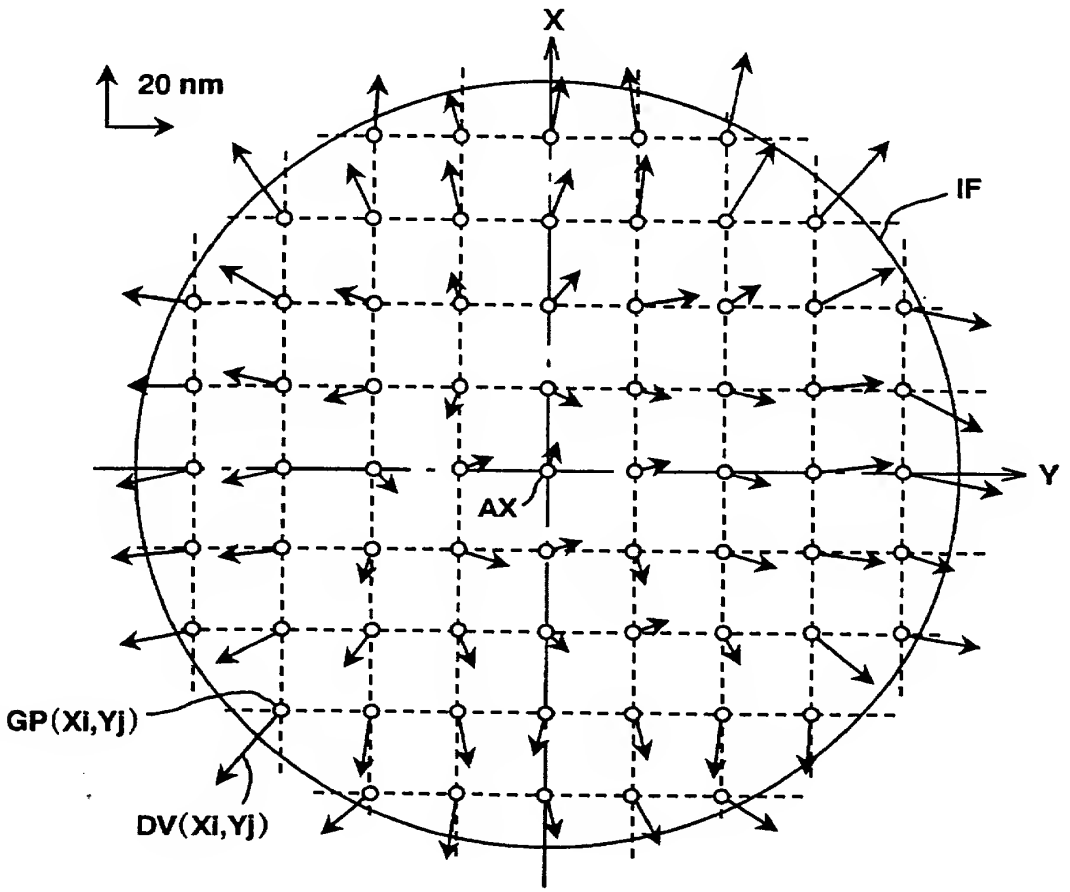


Fig.3

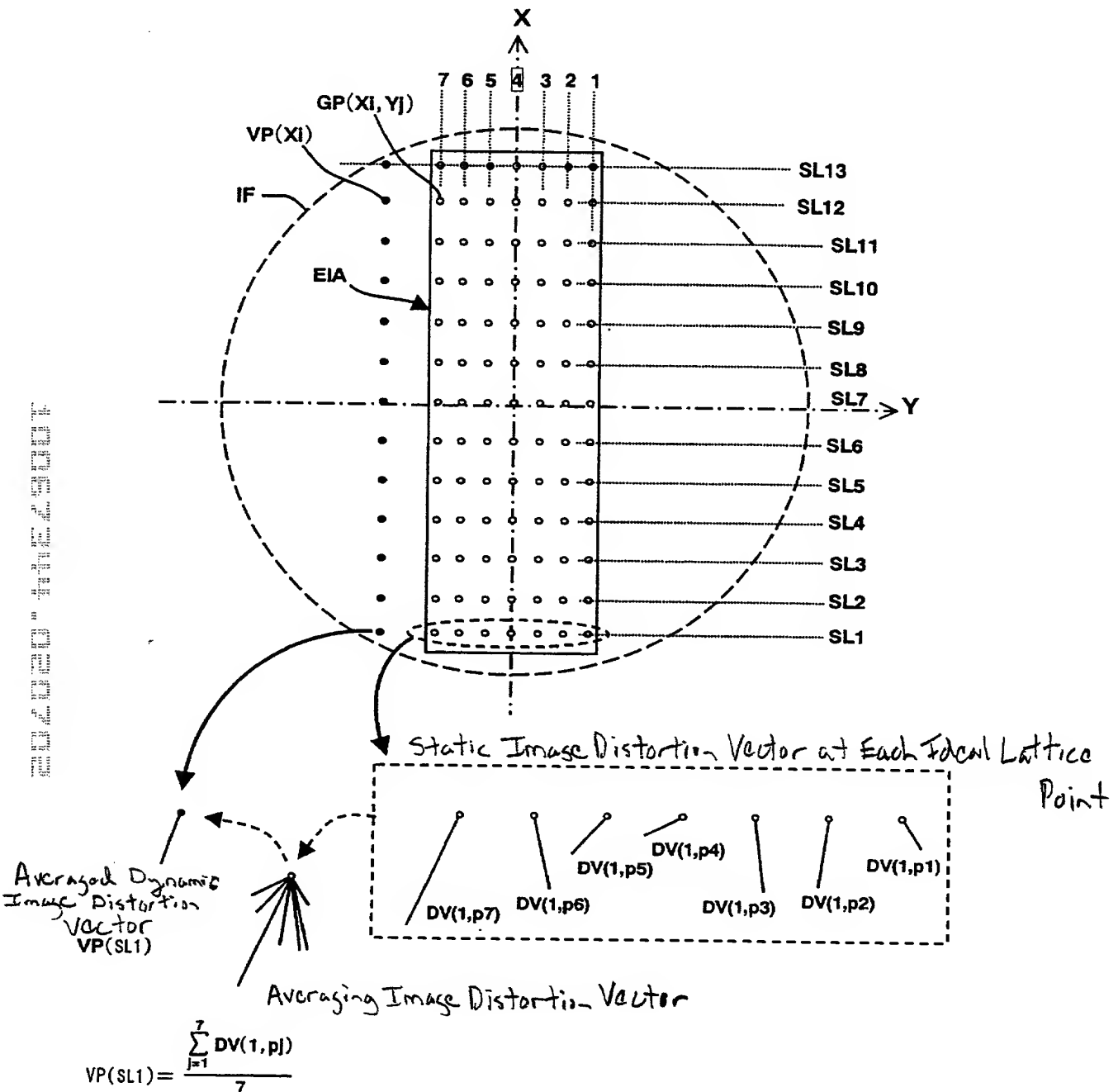

X
7 6 5 4 3 2 1
GP(Xi, Yj)
VP(Xi)
IF
EIA
SL13
SL12
SL11
SL10
SL9
SL8
SL7
Y
SL6
SL5
SL4
SL3
SL2
SL1
Static Image Distortion Vector at Each Focal Lattice Point
DV(1,p7)
DV(1,p6)
DV(1,p5)
DV(1,p4)
DV(1,p3)
DV(1,p2)
DV(1,p1)
Averaged Dynamic Image Distortion Vector VP(SL1)
Averaging Image Distortion Vector
$VP(SL1) = \frac{\sum_{j=1}^{7} DV(1,pj)}{7}$

Fig. 4

Fig.5(A)

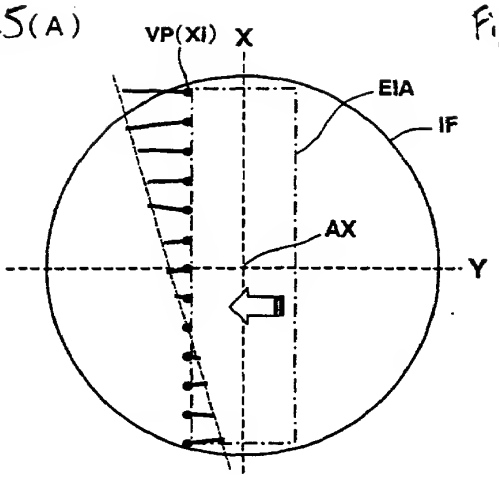


Fig.5(B)

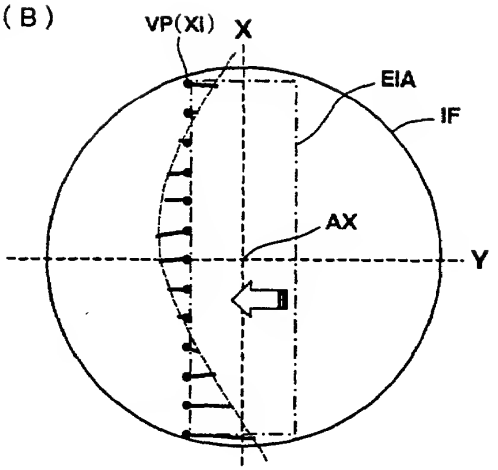


Fig.5(C)

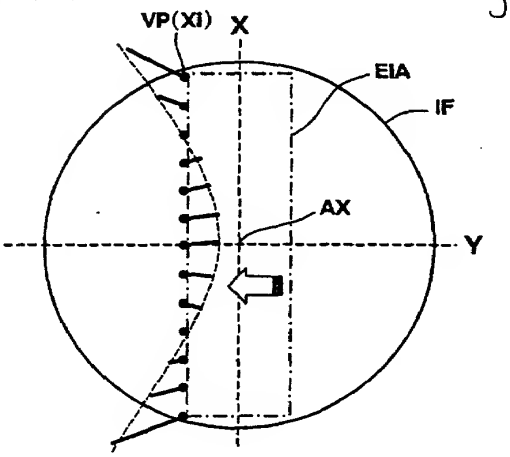


Fig.5(D)

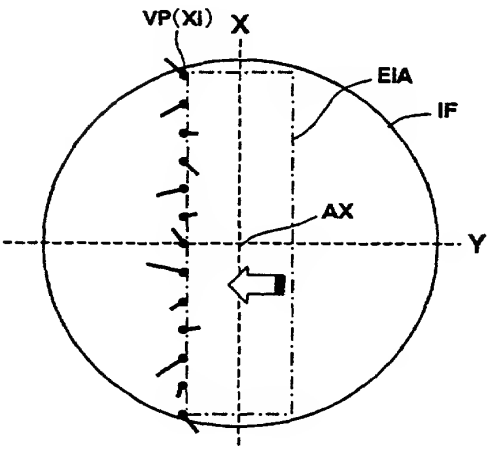


Fig. 6(A)

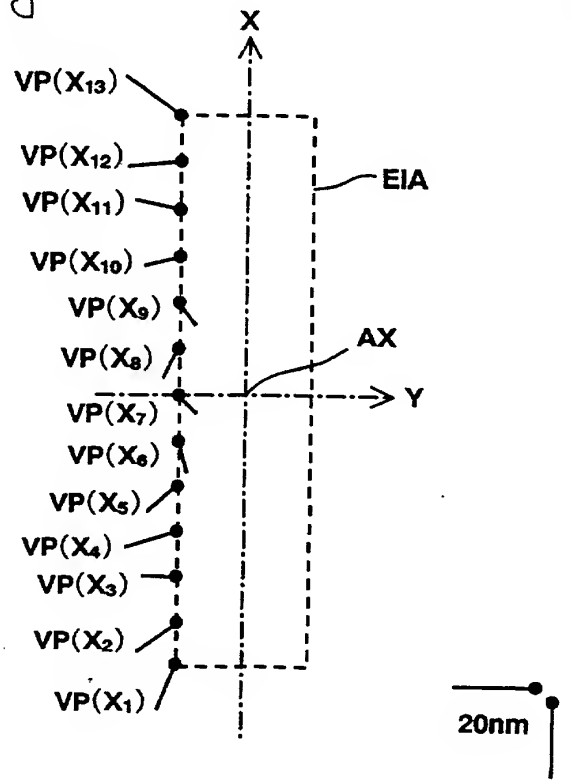
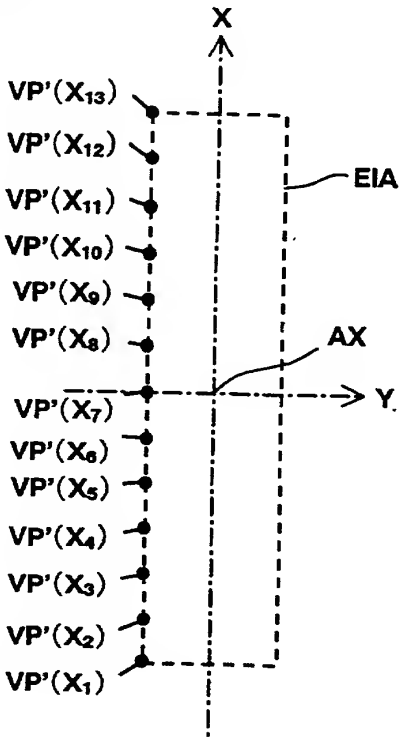


Fig. 6(B)



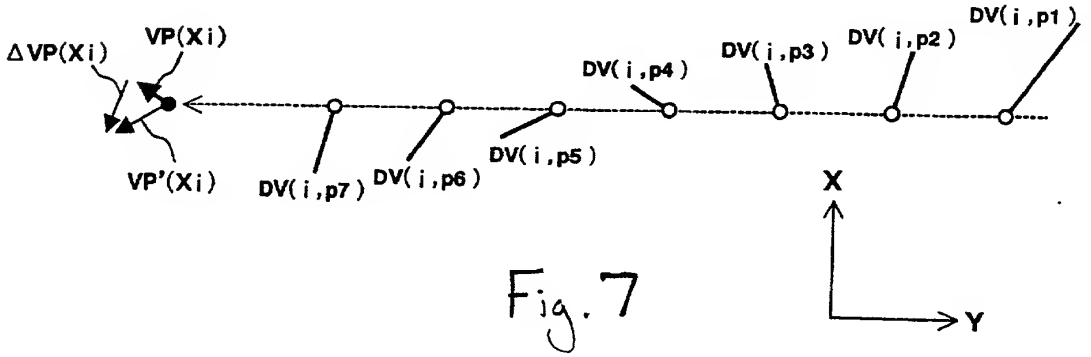


Fig. 7

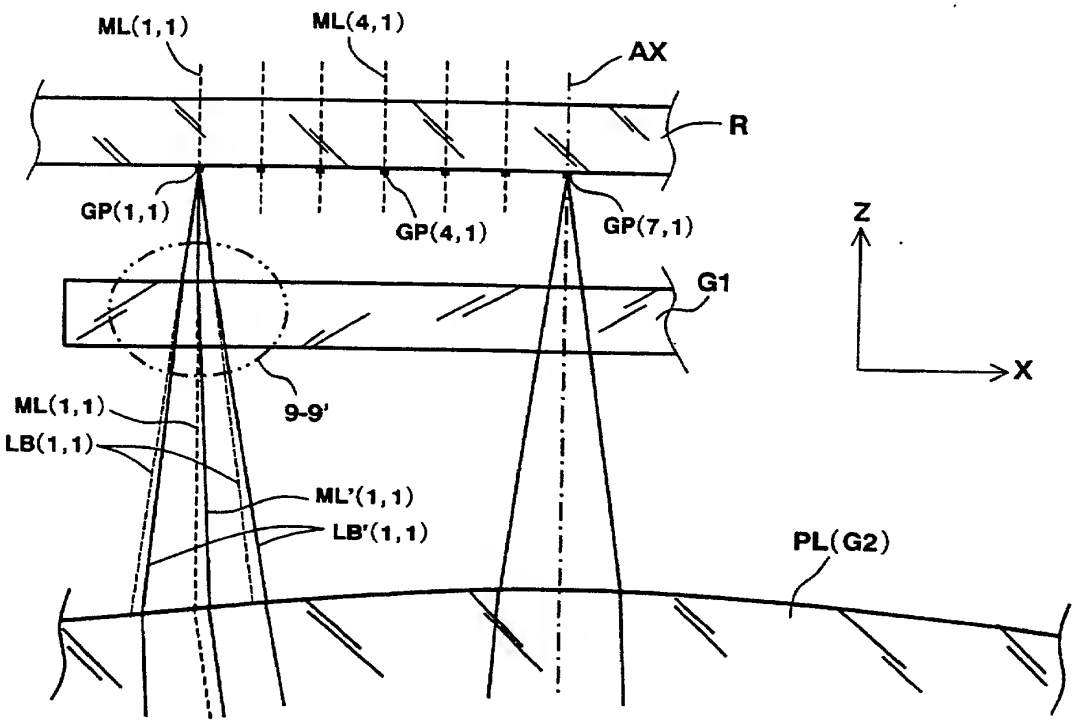


Fig. 8

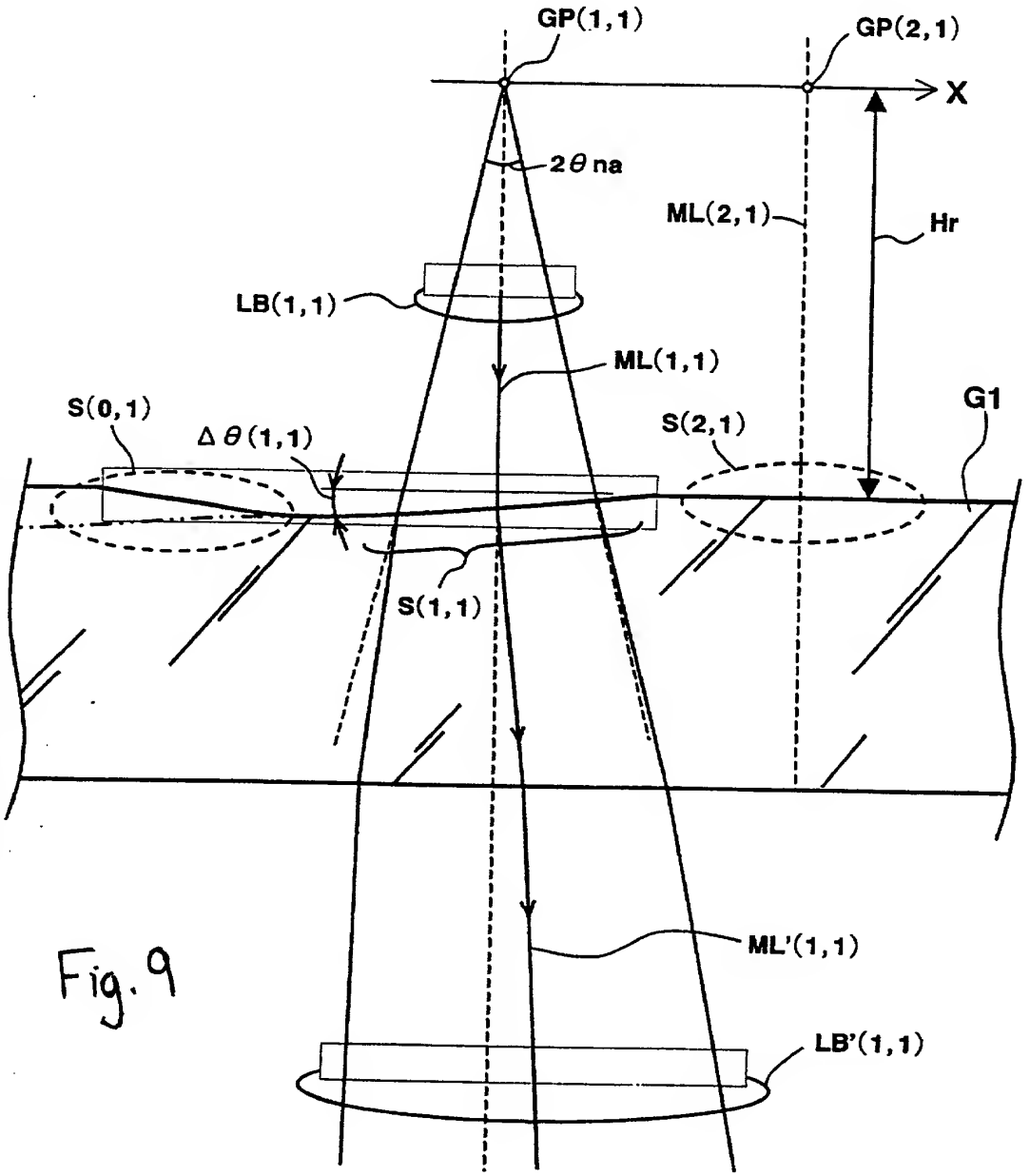

GP(1,1)
GP(2,1)
X
2θna
ML(2,1)
Hr
LB(1,1)
ML(1,1)
S(0,1)
Δθ(1,1)
S(2,1)
G1
S(1,1)
ML'(1,1)
LB'(1,1)

Fig. 9

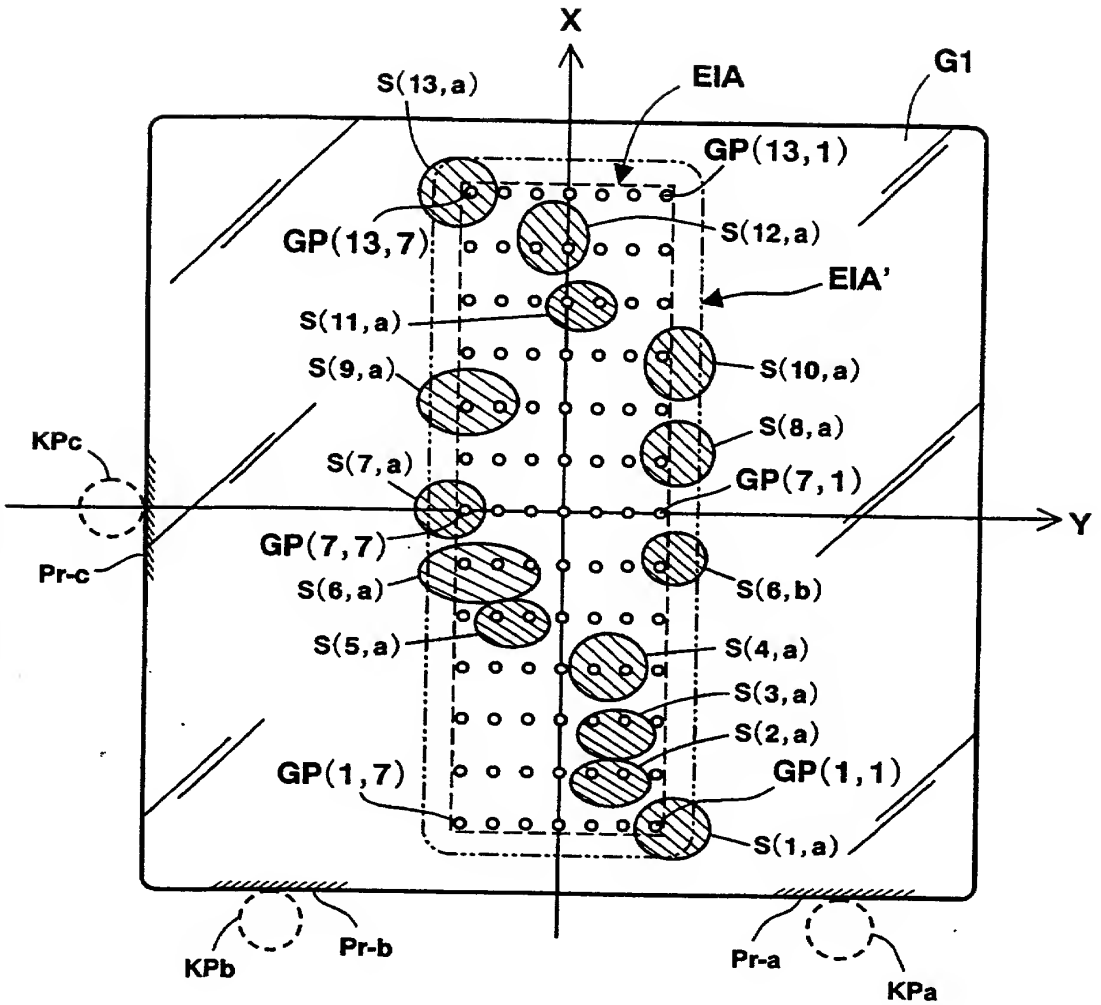

X
Y
S(13,a)
EIA
G1
GP(13,1)
GP(13,7)
S(12,a)
EIA'
S(11,a)
S(9,a)
S(10,a)
S(8,a)
KPc
S(7,a)
GP(7,1)
GP(7,7)
Pr-c
S(6,a)
S(6,b)
S(5,a)
S(4,a)
S(3,a)
S(2,a)
GP(1,7)
GP(1,1)
S(1,a)
KPb
Pr-b
Pr-a
KPa

Fig. 10

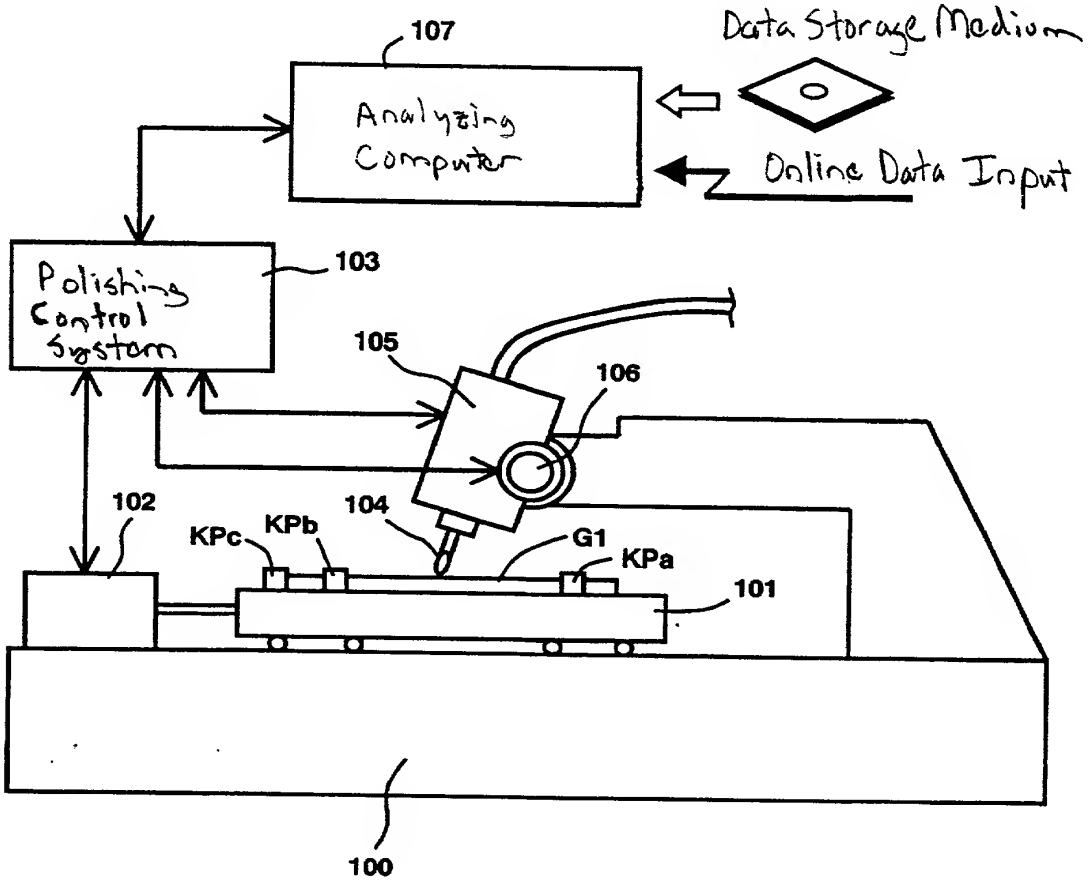

107
Data Storage Medium
Analyzing Computer
Online Data Input
Polishing Control System
103
105
106
102
104
KPc
KPb
G1
KPa
101
100

Fig. 11

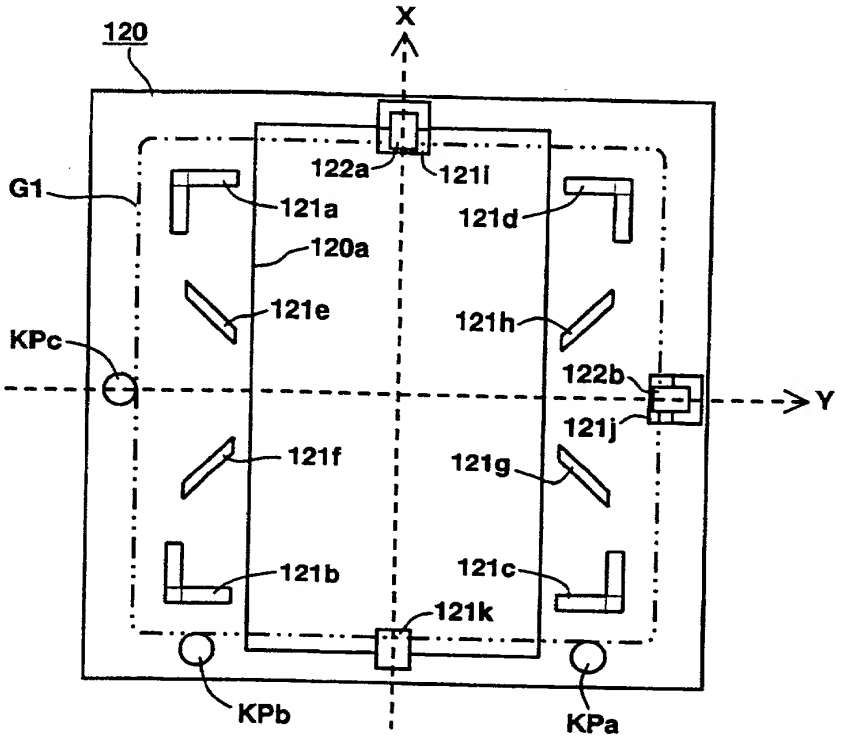

120
X
G1
122a
121l
121a
121d
120a
121e
121h
KPc
122b
Y
121j
121f
121g
121b
121c
121k
KPb
KPa

Fig. 12

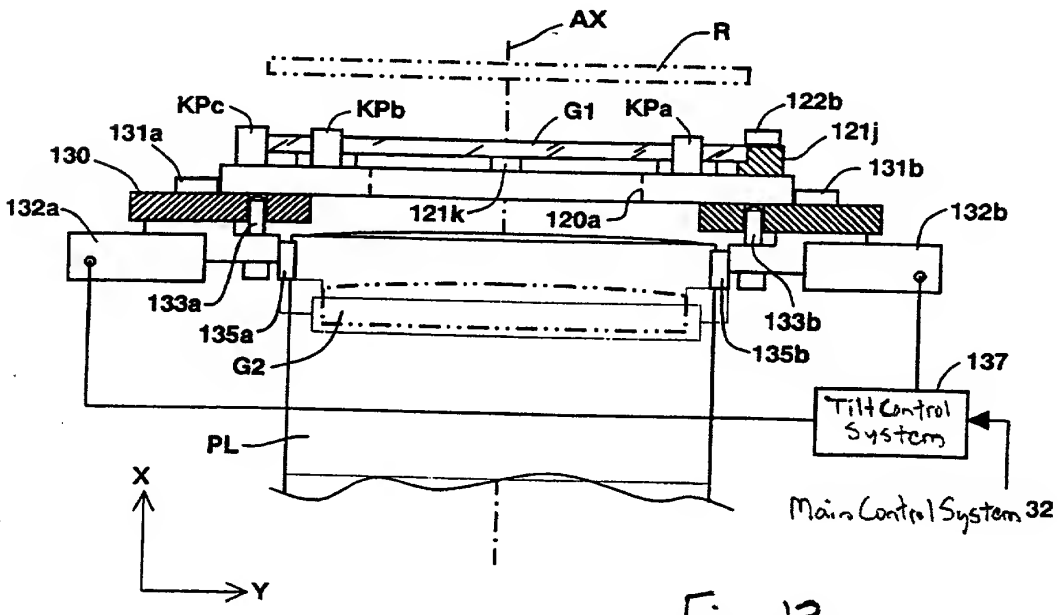

AX
R
KPc
KPb
G1
KPa
122b
131a
121j
130
131b
132a
121k
120a
132b
133a
133b
135a
135b
G2
137
Tilt Control System
PL
X
Y
Main Control System 32

Fig. 13

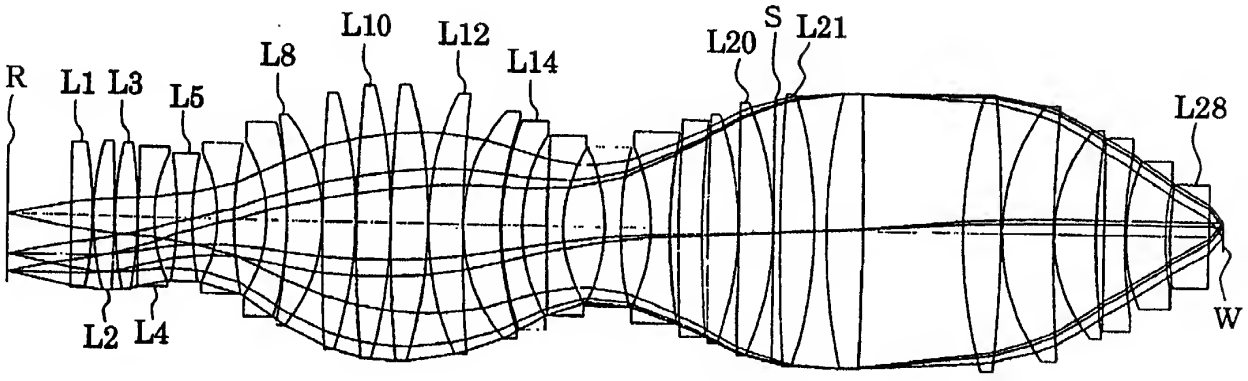


Fig. 14

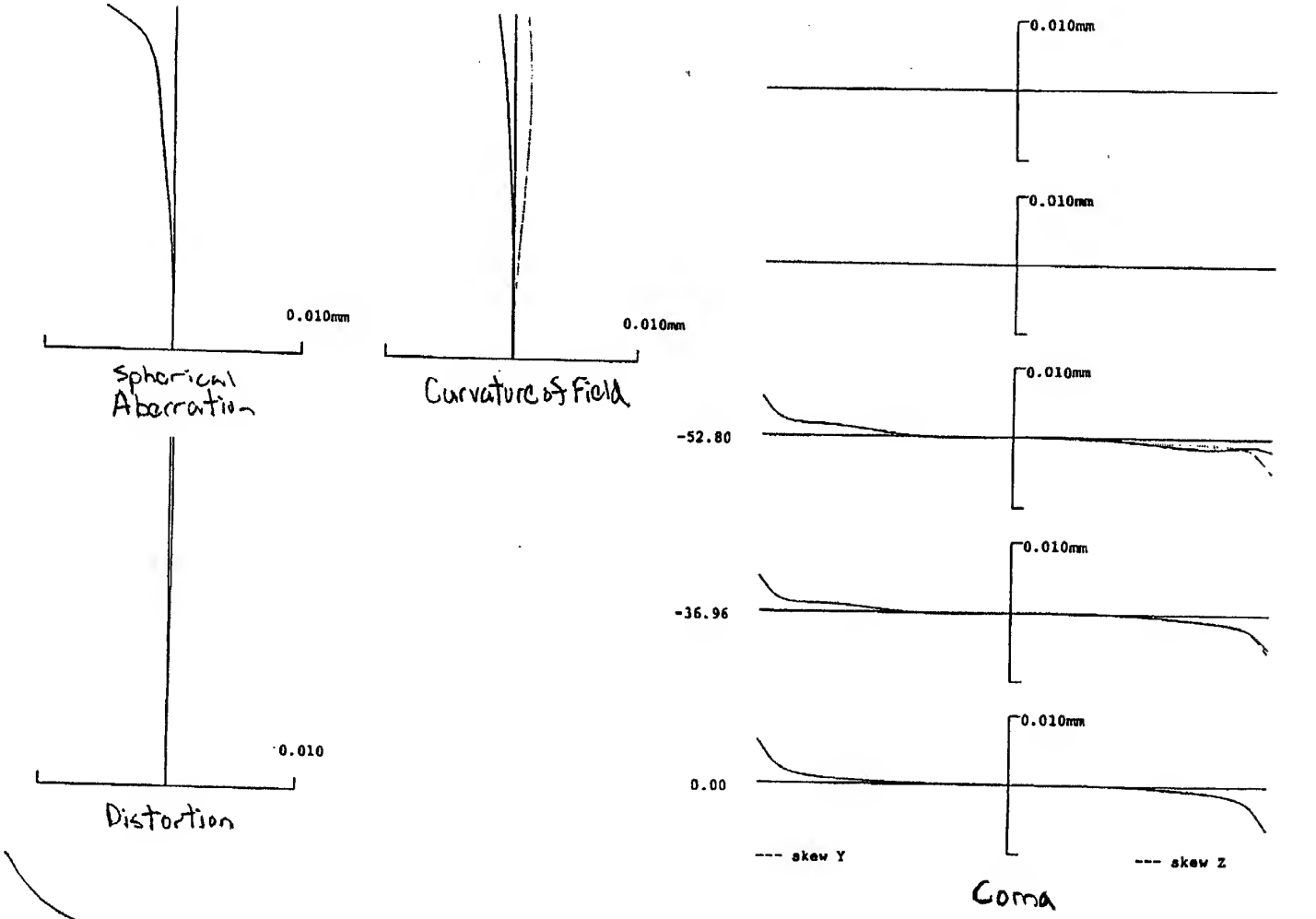

0.010mm
Spherical Aberration
0.010mm
Curvature of Field
0.010mm
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma
0.010
Distortion

Fig. 15

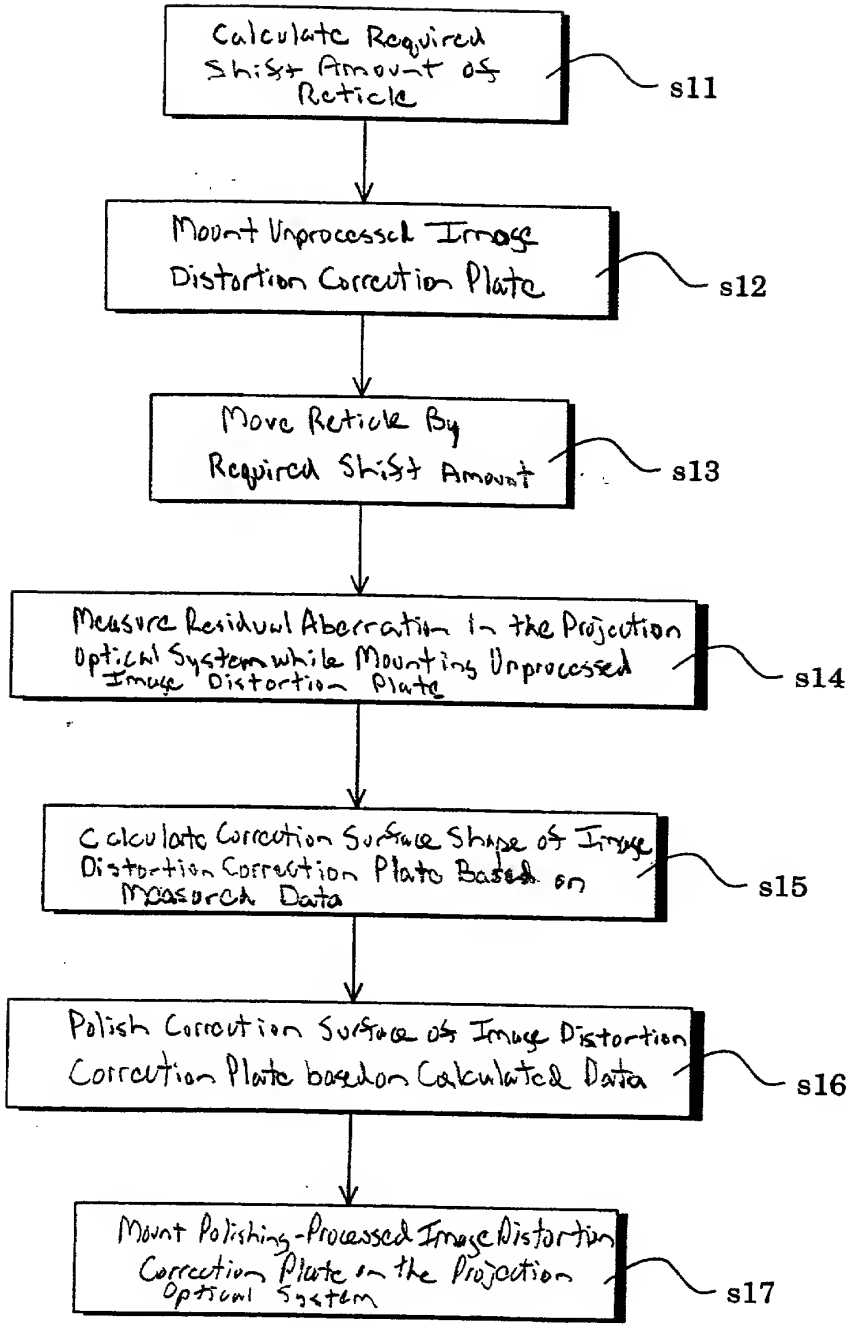

Calculate Required Shift Amount of Reticle
s11
Mount Unprocessed Image Distortion Correction Plate
s12
Move Reticle By Required Shift Amount
s13
Measure Residual Aberration in the Projection Optical System while Mounting Unprocessed Image Distortion Plate
s14
Calculate Correction Surface Shape of Image Distortion Correction Plate Based on Measured Data
s15
Polish Correction Surface of Image Distortion Correction Plate based on Calculated Data
s16
Mount Polishing-Processed Image Distortion Correction Plate on the Projection Optical System
s17

Fig. 16

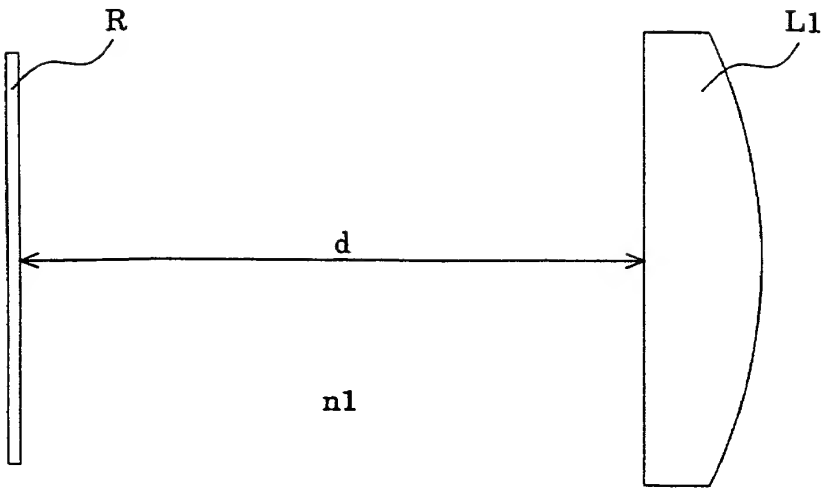


Fig.17(a)

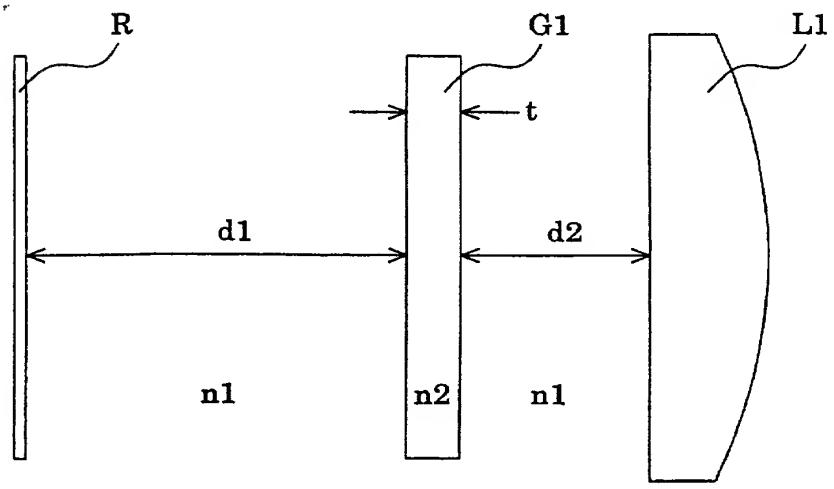


Fig.17(b)

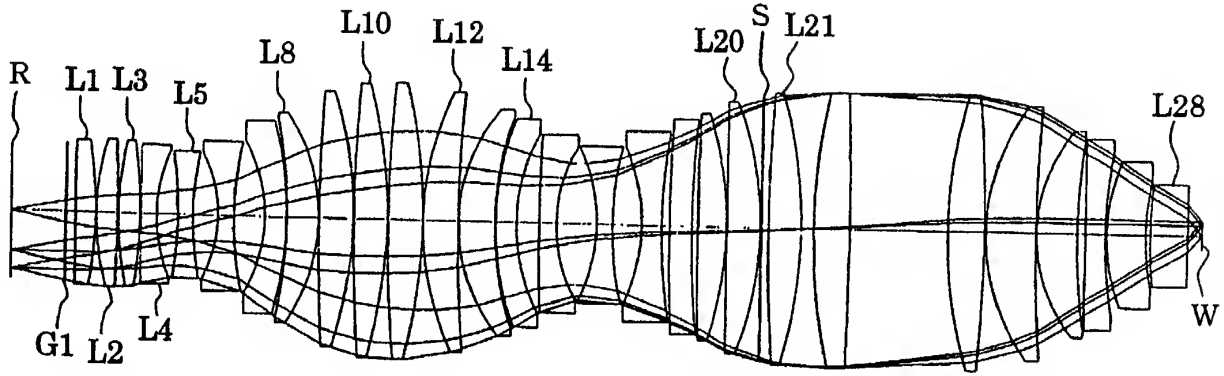


Fig. 18

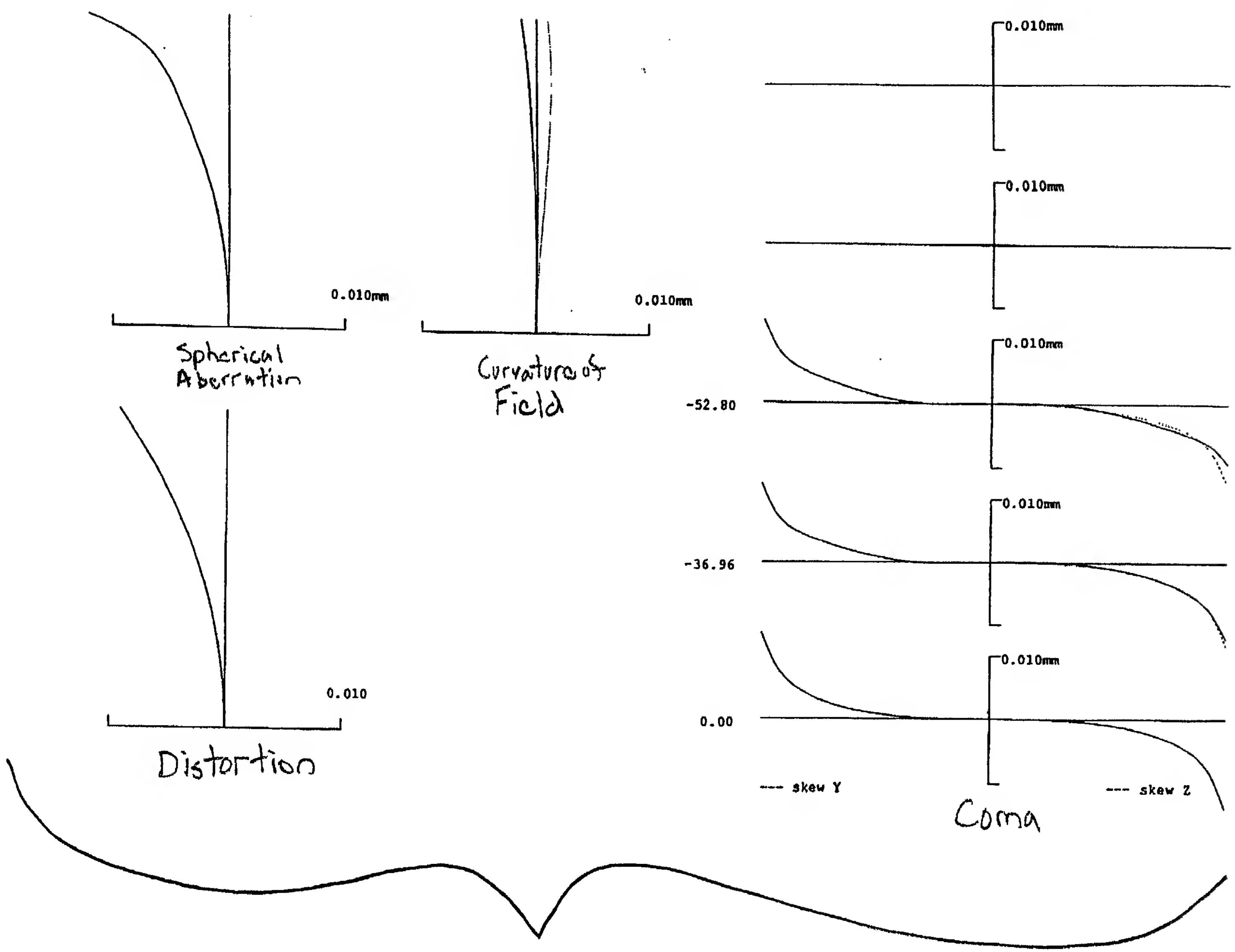

0.010mm
Spherical Aberration
0.010mm
Curvature of Field
0.010
Distortion
0.010mm
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma

Fig. 19

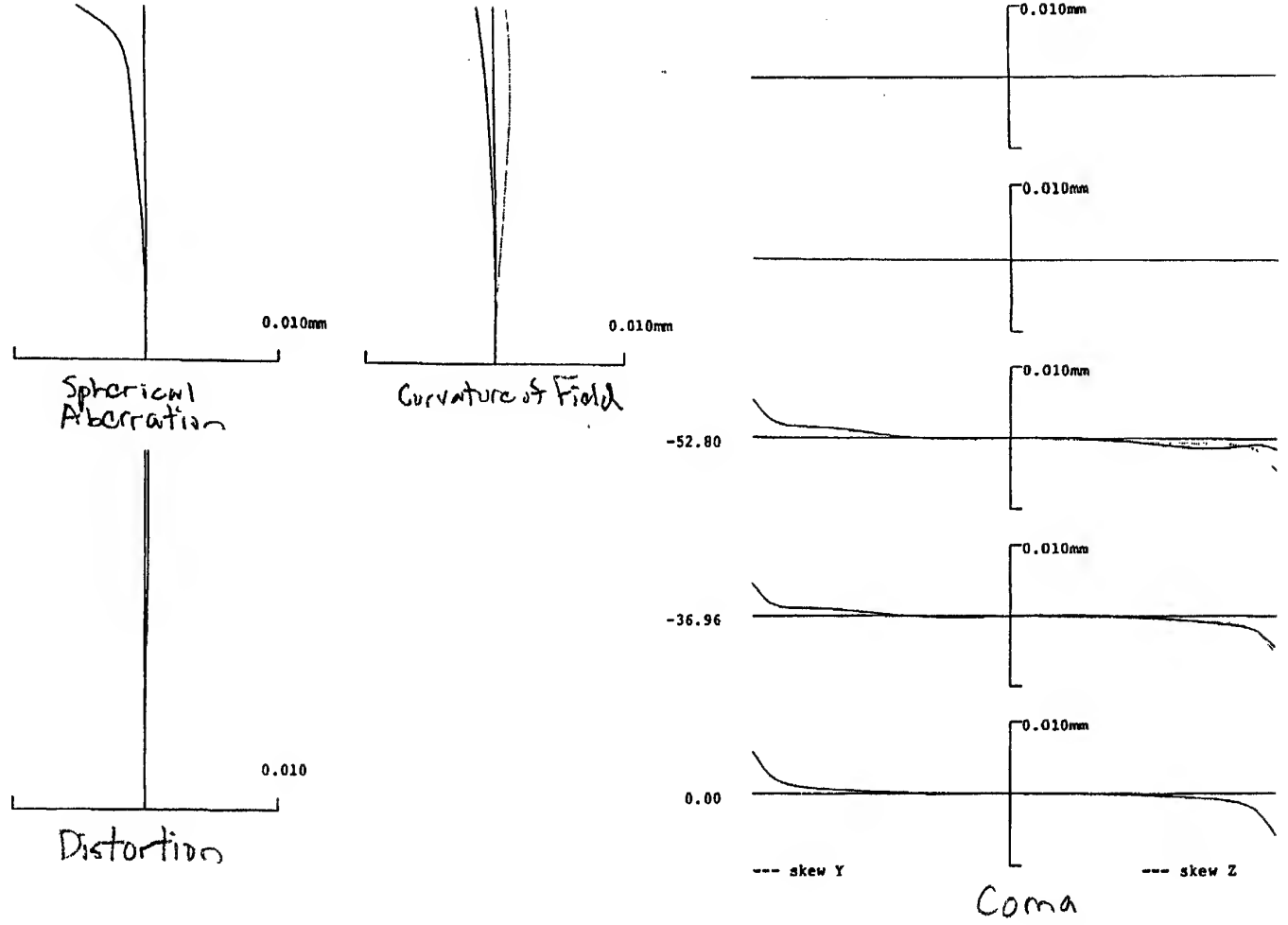

0.010mm
Spherical Aberration
0.010mm
Curvature of Field
0.010
Distortion
0.010mm
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma

Fig. 20

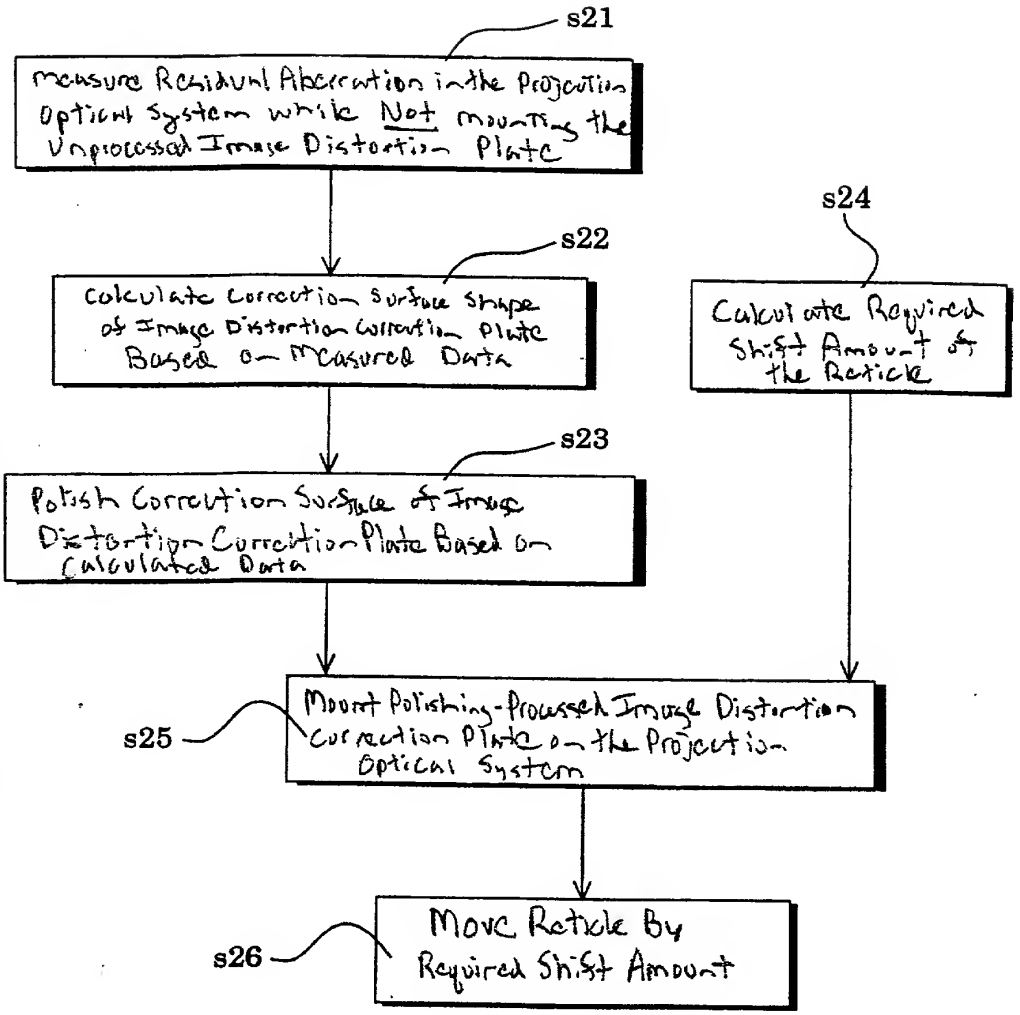

s21
Measure Residual Aberration in the Projection Optical System while Not mounting the Unprocessed Image Distortion Plate
s22
Calculate Correction Surface Shape of Image Distortion Correction Plate Based on Measured Data
s23
Polish Correction Surface of Image Distortion Correction Plate Based on Calculated Data
s24
Calculate Required Shift Amount of the Reticle
s25
Mount Polishing-Processed Image Distortion correction Plate on the Projection Optical System
s26
Move Reticle By Required Shift Amount

Fig. 21

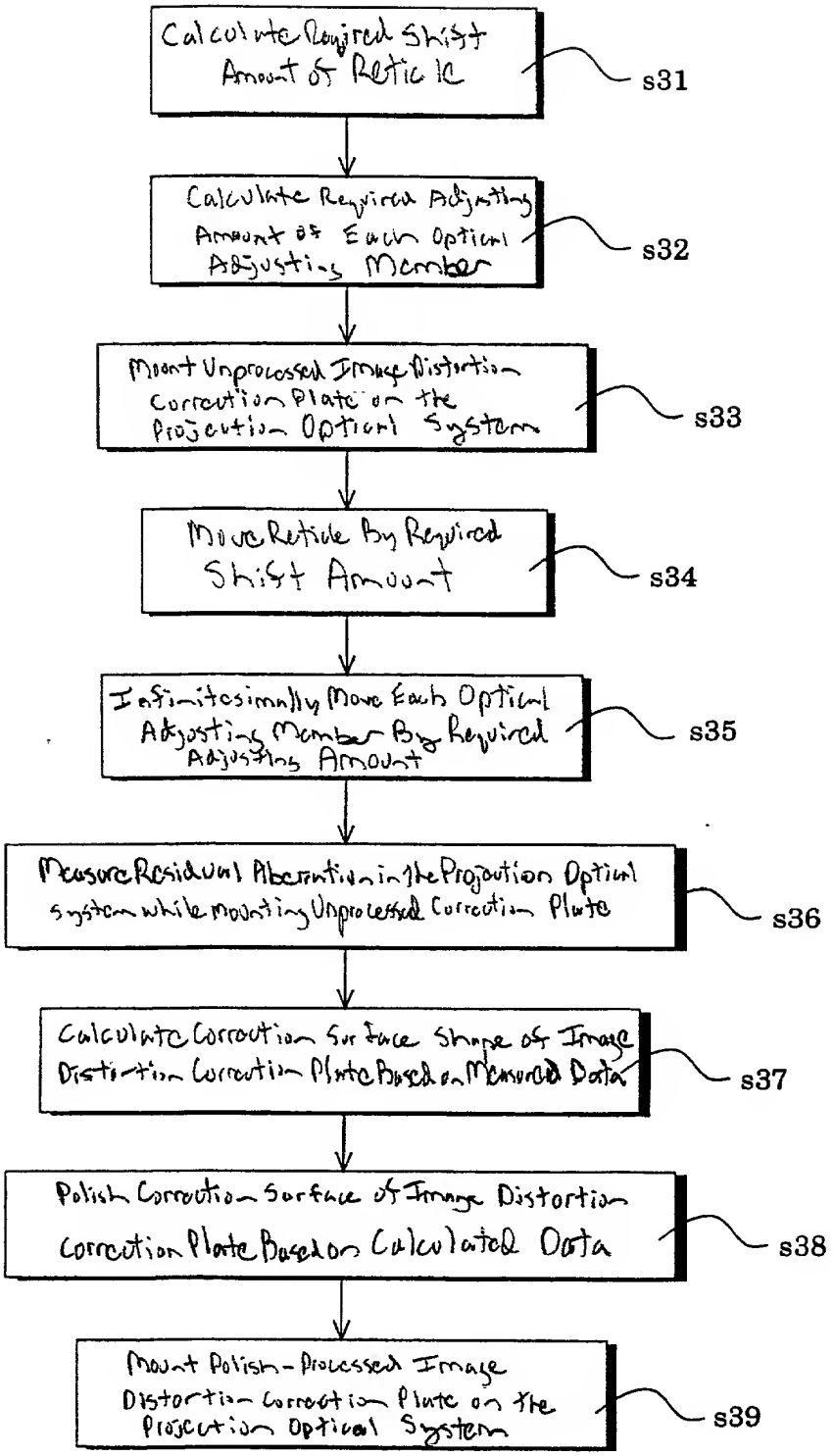

Calculate Required Shift Amount of Reticle
s31
Calculate Required Adjusting Amount of Each Optical Adjusting Member
s32
Mount Unprocessed Image Distortion Correction Plate on the Projection Optical System
s33
Move Reticle by Required Shift Amount
s34
Infinitesimally Move Each Optical Adjusting Member By Required Adjusting Amount
s35
Measure Residual Aberration in the Projection Optical system while Mounting Unprocessed Correction Plate
s36
Calculate Correction Surface Shape of Image Distortion Correction Plate Based on Measured Data
s37
Polish Correction Surface of Image Distortion Correction Plate Based on Calculated Data
s38
Mount Polish-Processed Image Distortion Correction Plate on the Projection Optical System
s39

Fig. 22

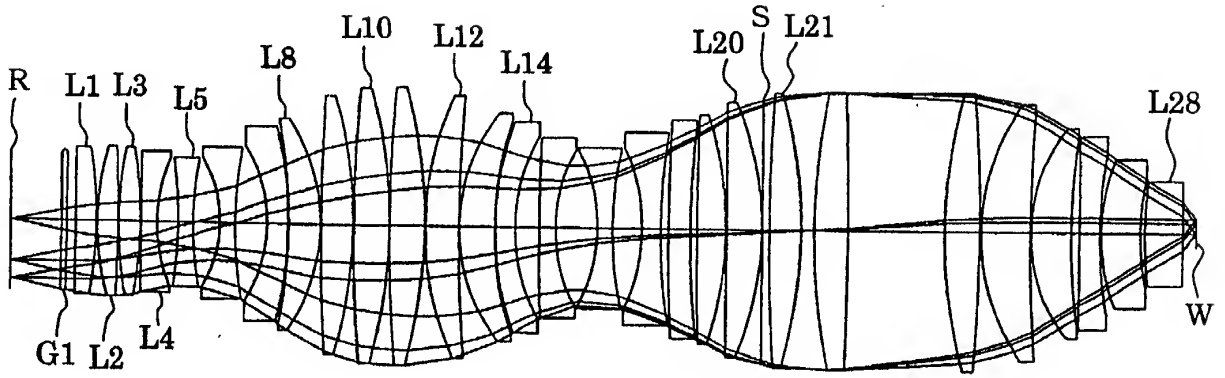


Fig.23

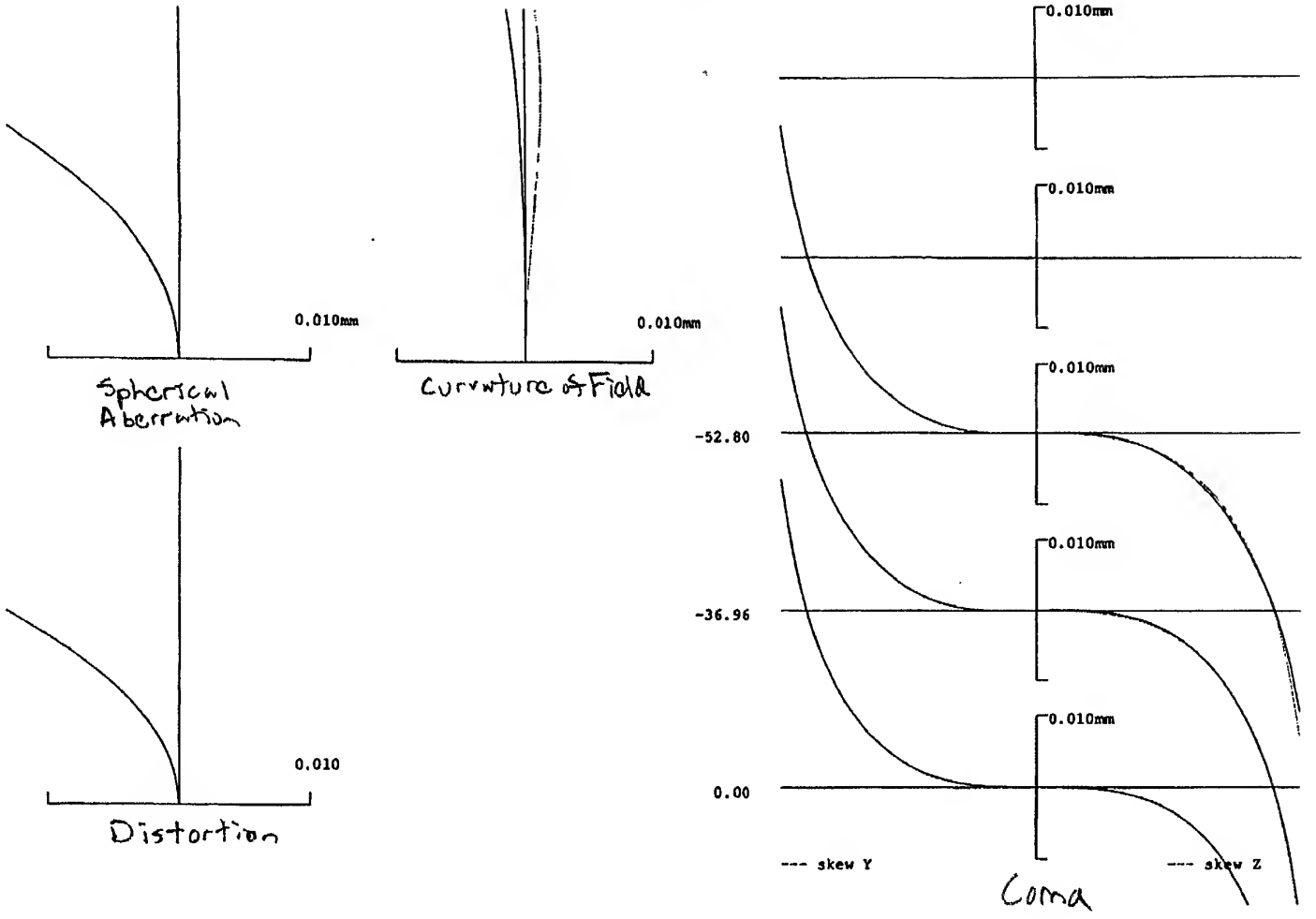

0.010mm
0.010mm
Spherical Aberration
Curvature of Field
0.010
Distortion
0.010mm
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma

Fig. 24

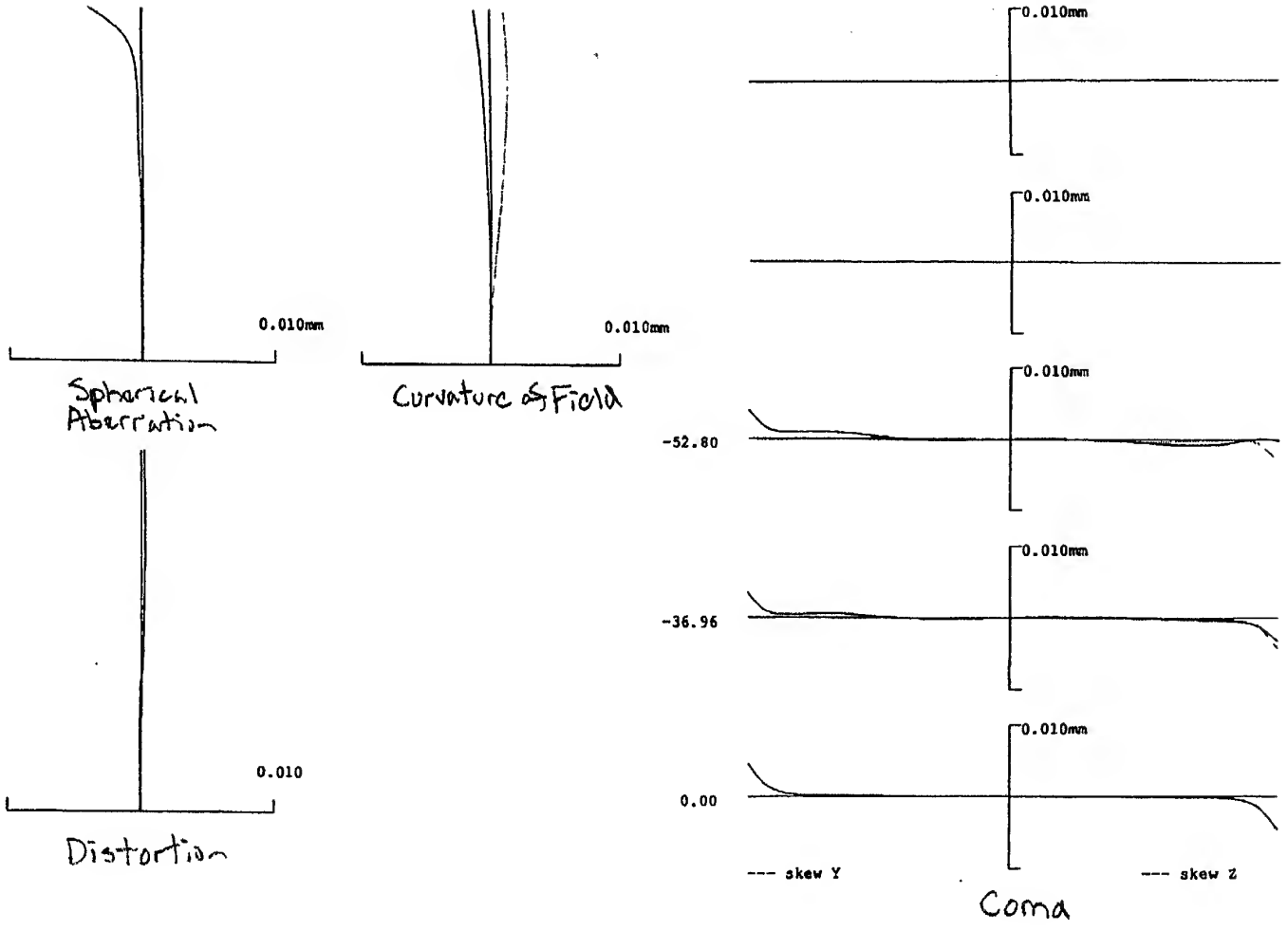

0.010mm
0.010mm
Spherical Aberration
0.010mm
0.010mm
Curvature of Field
0.010
Distortion
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma

Fig. 25

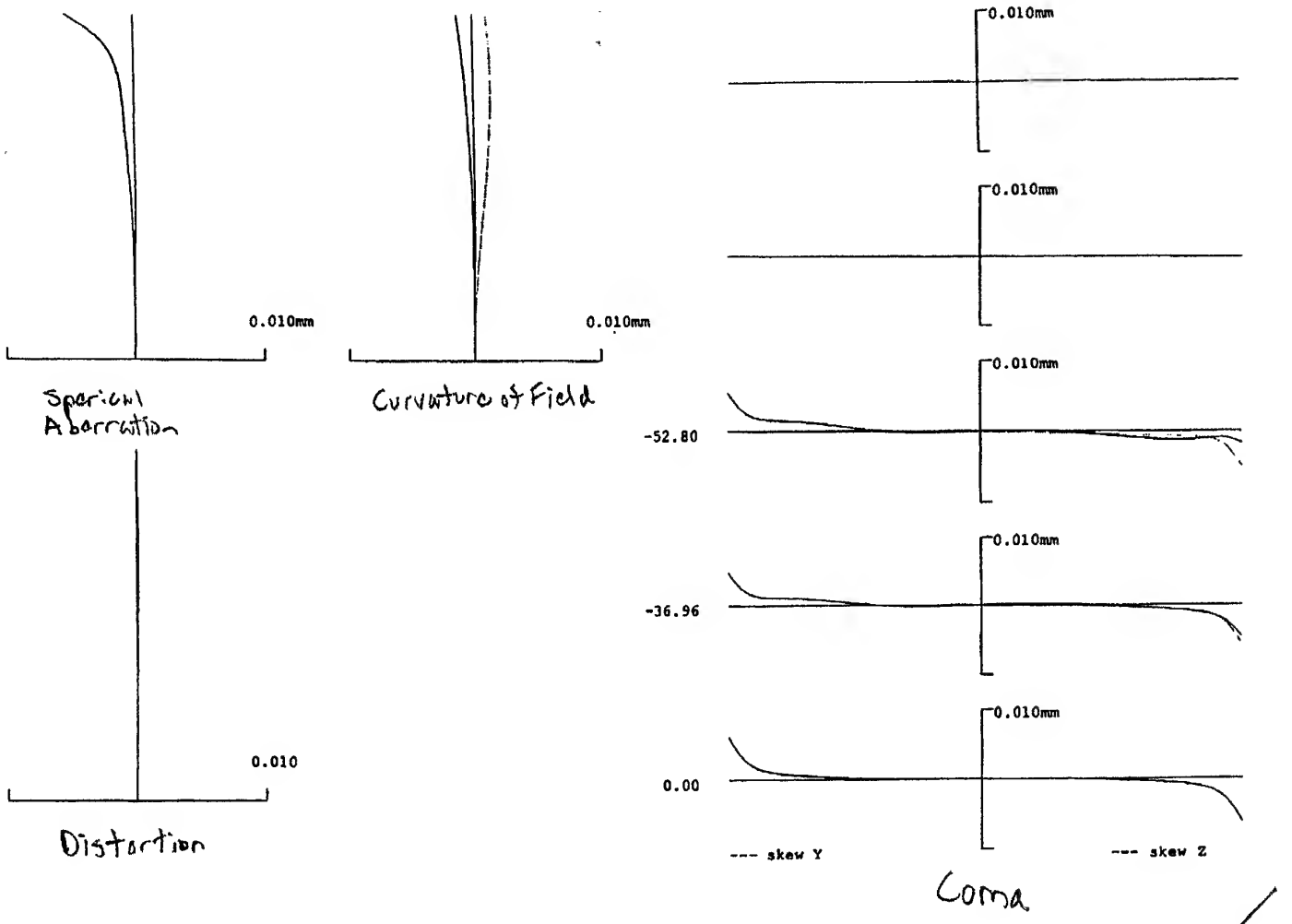

0.010mm
0.010mm
Spherical Aberration
0.010mm
0.010mm
Curvature of Field
0.010
Distortion
0.010mm
0.010mm
-52.80
0.010mm
-36.96
0.010mm
0.00
--- skew Y
--- skew Z
Coma

Fig. 26

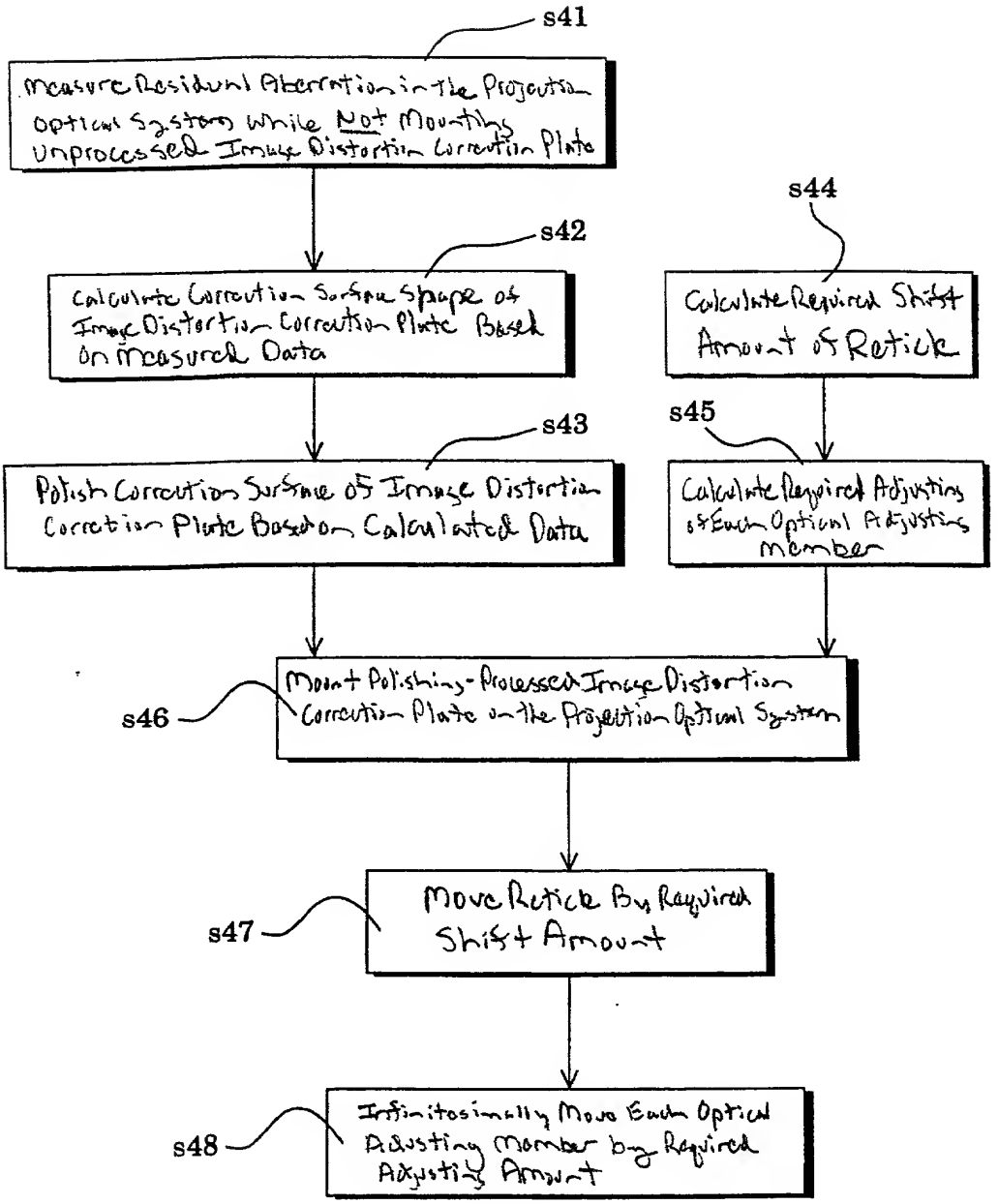

s41
Measure Residual Aberration in the Projection Optical System While Not Mounting Unprocessed Image Distortion Correction Plate
s42
Calculate Correction Surface Shape of Image Distortion Correction Plate Based on Measured Data
s43
Polish Correction Surface of Image Distortion Correction Plate Based on Calculated Data
s44
Calculate Required Shift Amount of Reticle
s45
Calculate Required Adjusting of Each Optical Adjusting Member
s46
Mount Polishing-Processed Image Distortion Correction Plate on the Projection Optical System
s47
Move Reticle By Required Shift Amount
s48
Infinitesimally Move Each Optical Adjusting Member by Required Adjusting Amount

Fig. 27

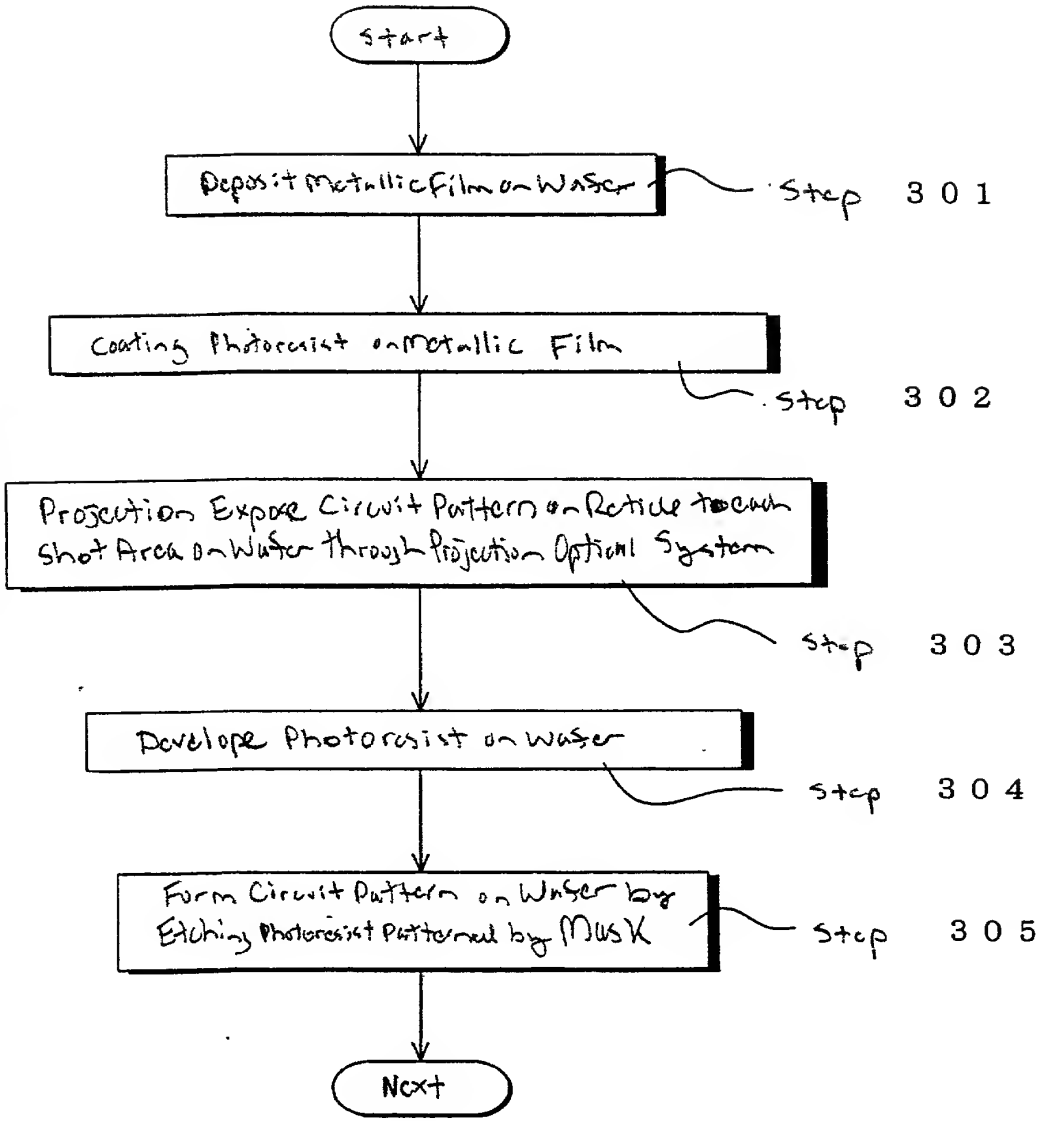

Start
Deposit Metallic Film on Wafer
Step 301
Coating Photoresist on Metallic Film
Step 302
Projection Expose Circuit Pattern on Reticle to each Shot Area on Wafer through Projection Optical System
Step 303
Develope Photoresist on Wafer
Step 304
Form Circuit Pattern on Wafer by Etching Photoresist Patterned by Mask
Step 305
Next

Fig. 28

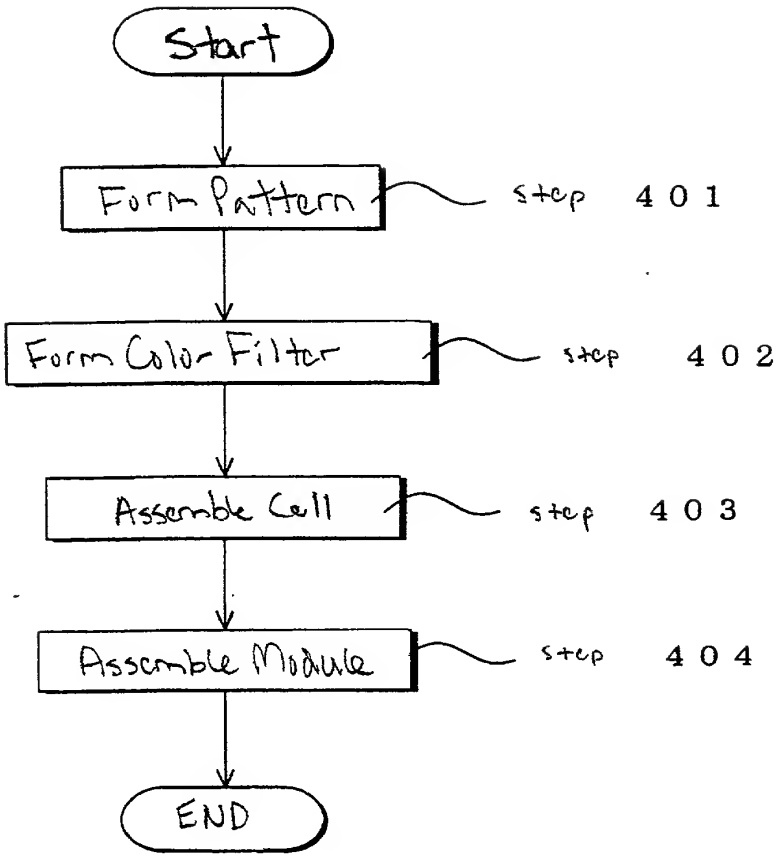

Start
Form Pattern
step 401
Form Color Filter
step 402
Assemble Cell
step 403
Assemble Module
step 404
END

Fig. 29

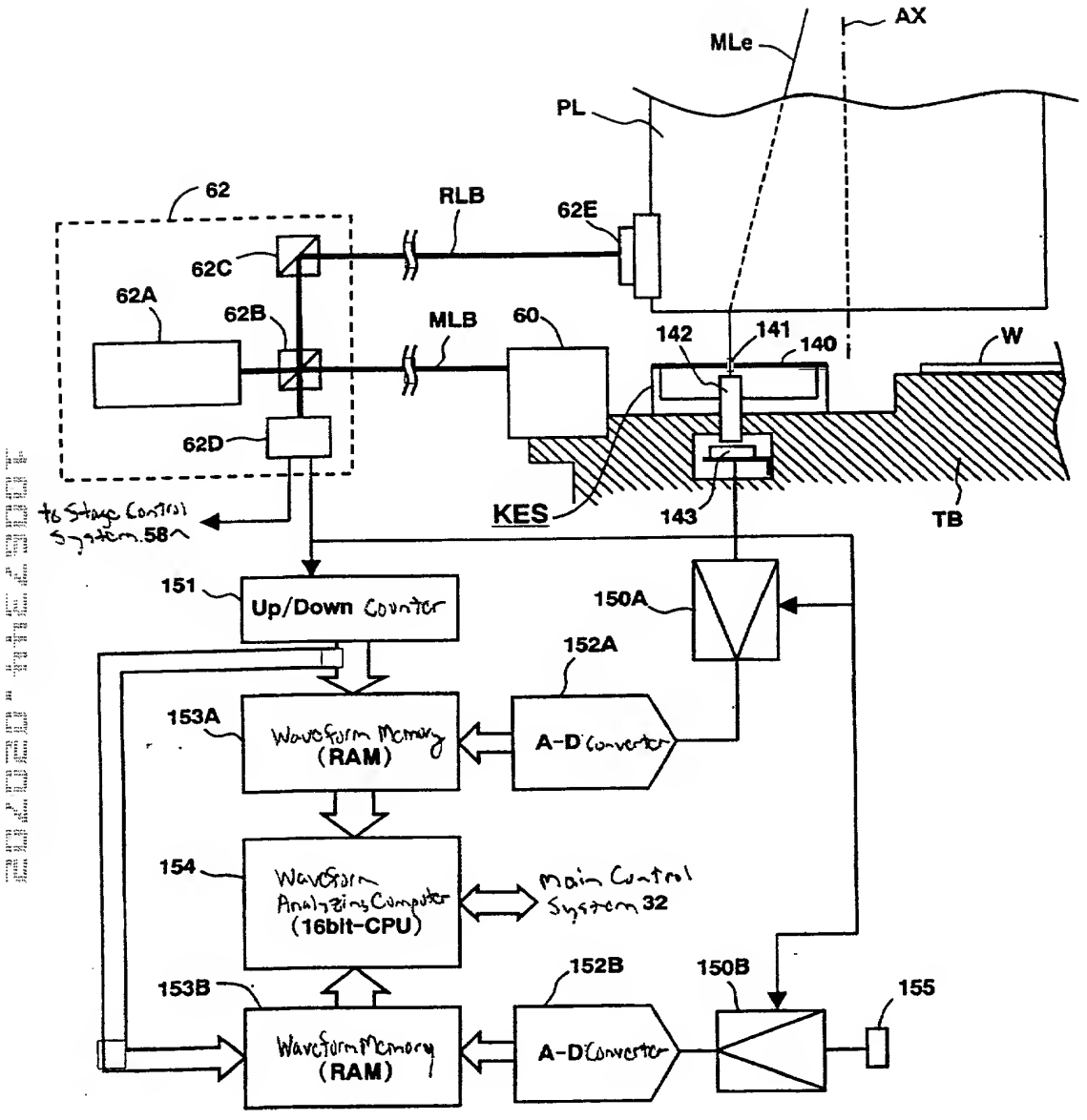

AX
MLe
PL
62
RLB
62E
62C
62A
62B
MLB
60
142
141
140
W
62D
to Stage Control System 58
KES
143
TB
151
Up/Down Counter
150A
152A
153A
Waveform Memory (RAM)
A-D Converter
154
Waveform Analyzing Computer (16bit-CPU)
Main Control System 32
153B
152B
150B
155
Waveform Memory (RAM)
A-D Converter

Fig. 30

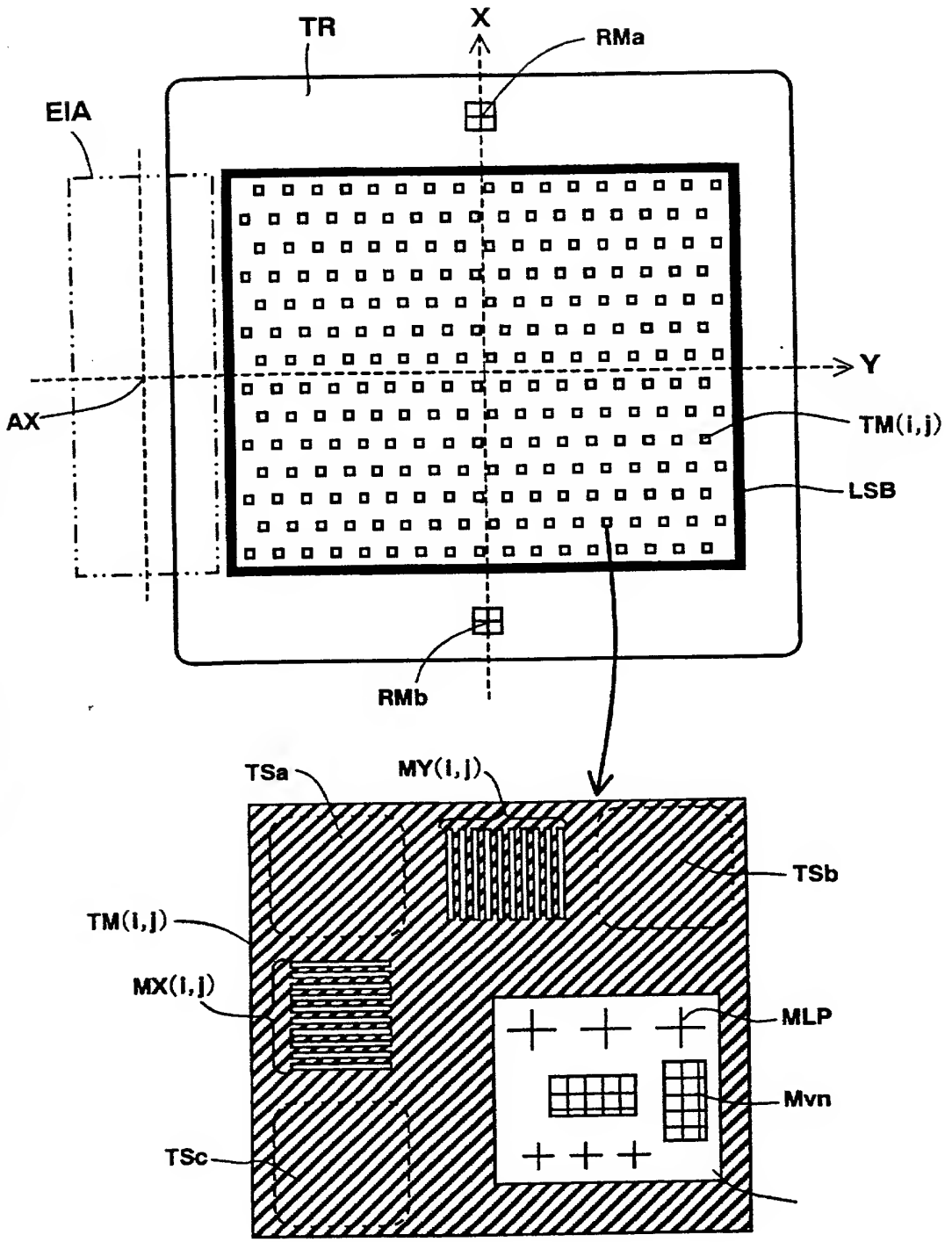


Fig. 31

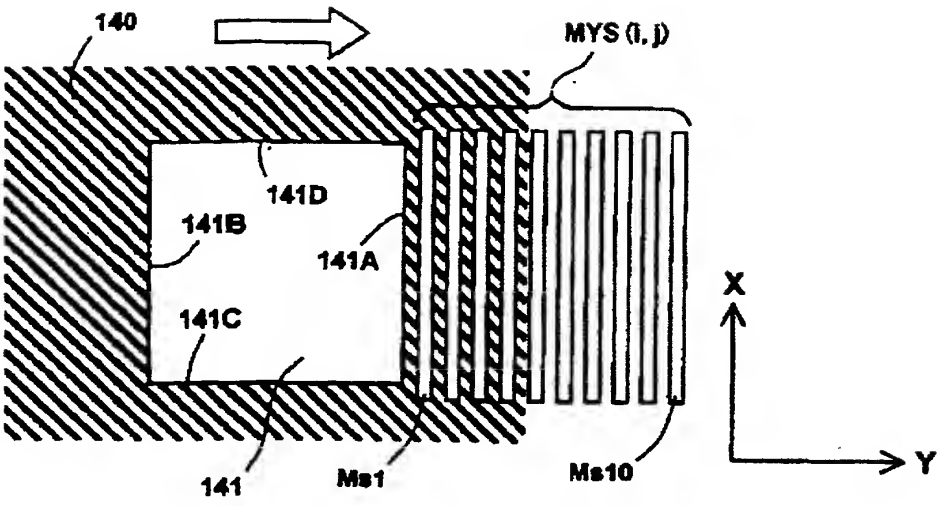

140
MYS (i, j)
141D
141B
141A
141C
141
Ms1
Ms10
X
Y

Fig. 32

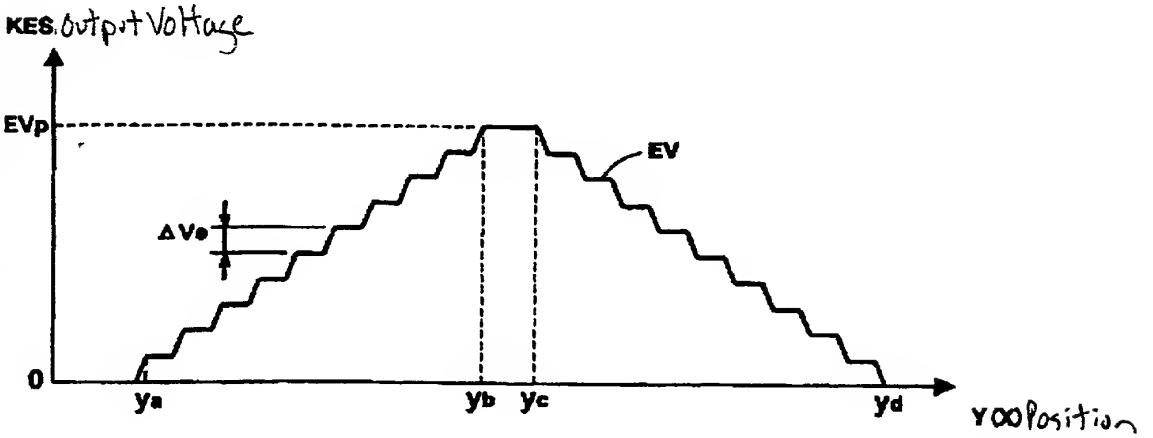

KES output Voltage
EVp
EV
ΔVe
0
ya
yb
yc
yd
Y00Position

Fig. 33

Fig.34(A)

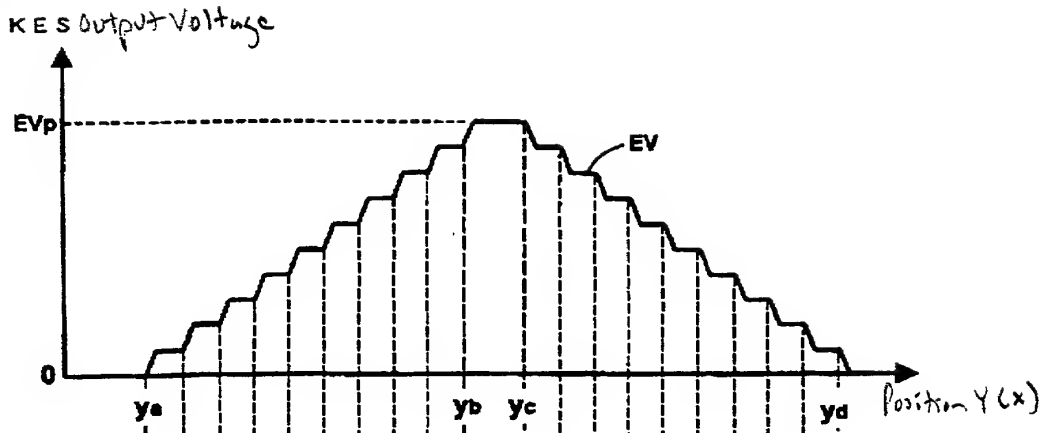
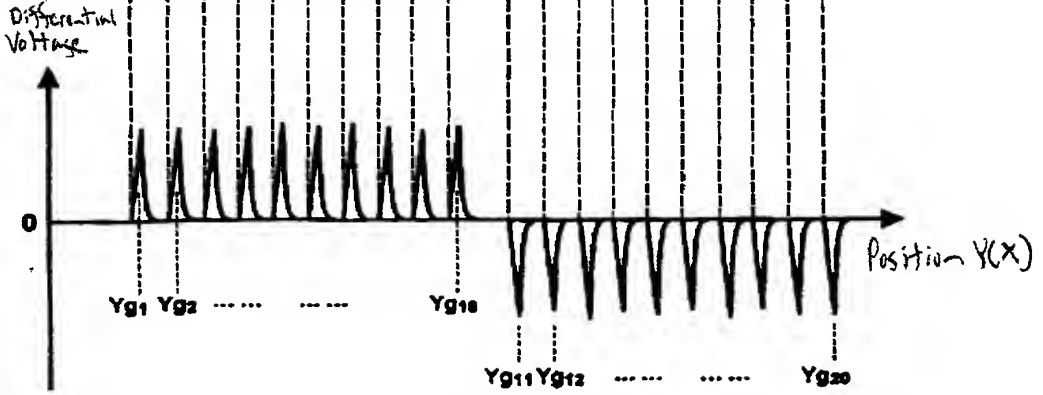


Fig.34(B)



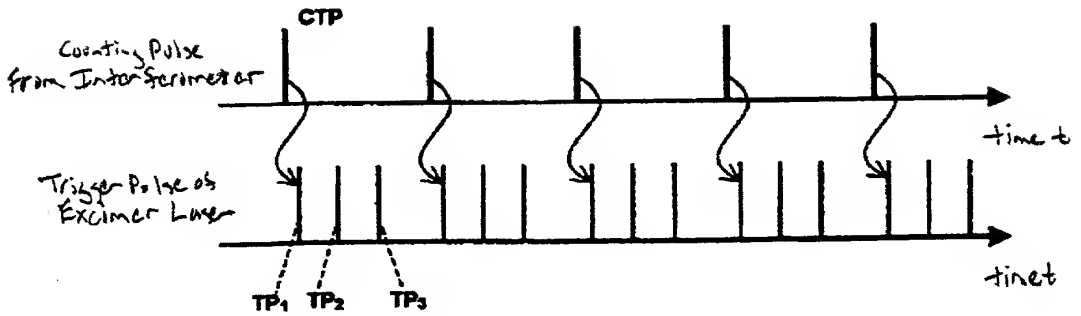


Fig.35

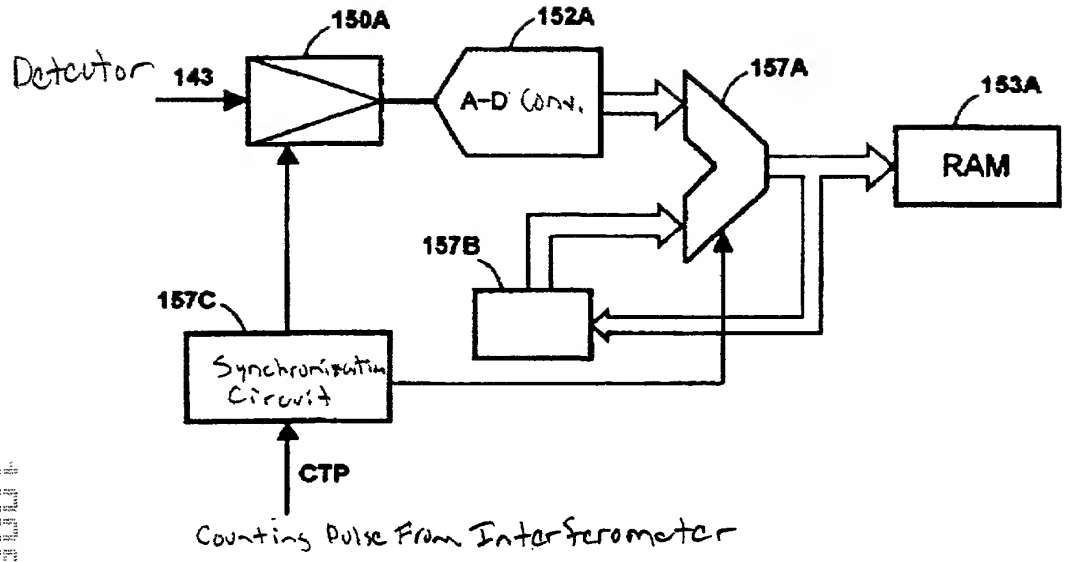

Detector
143
150A
152A
A-D Conv.
157A
153A
RAM
157B
157C
Synchronization Circuit
CTP
Counting Pulse From Interferometer

Fig. 36

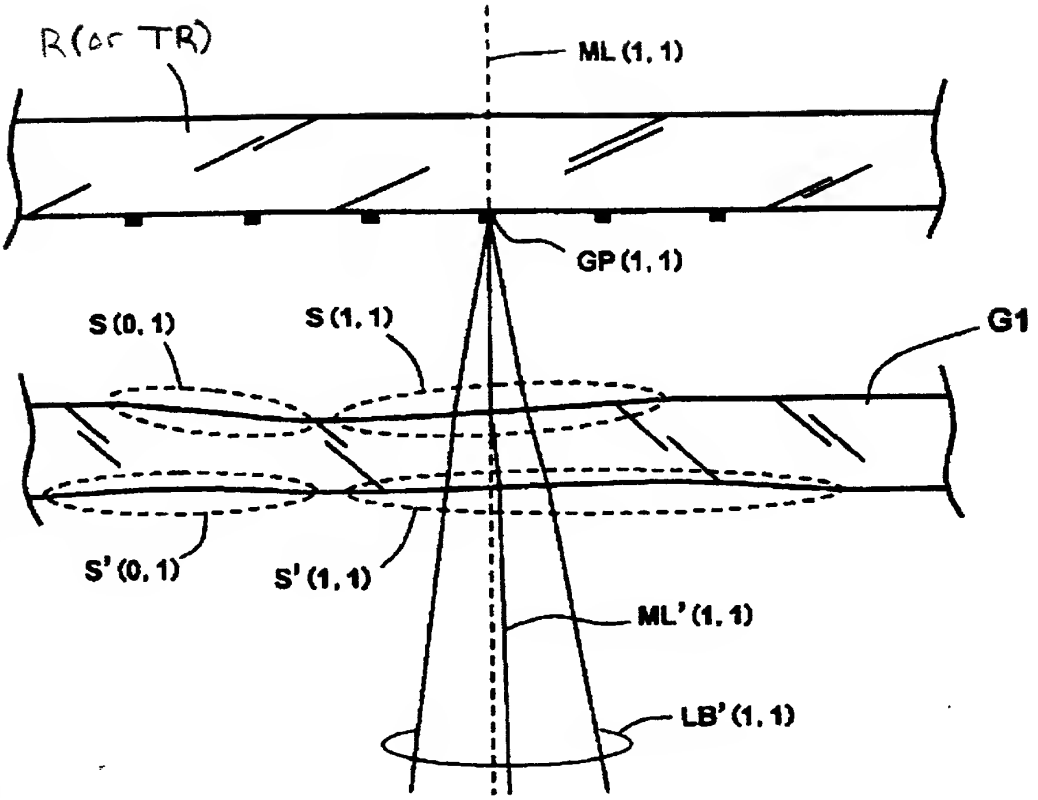


Fig. 37

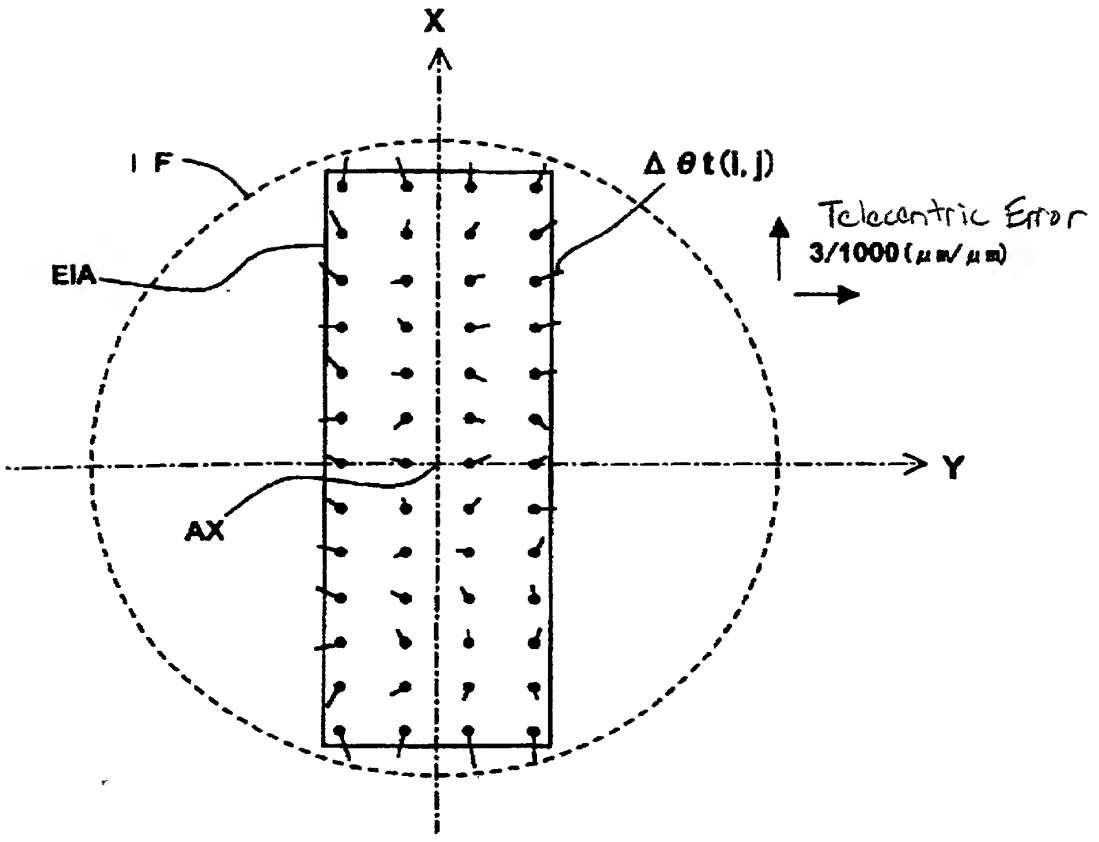


Fig. 3B

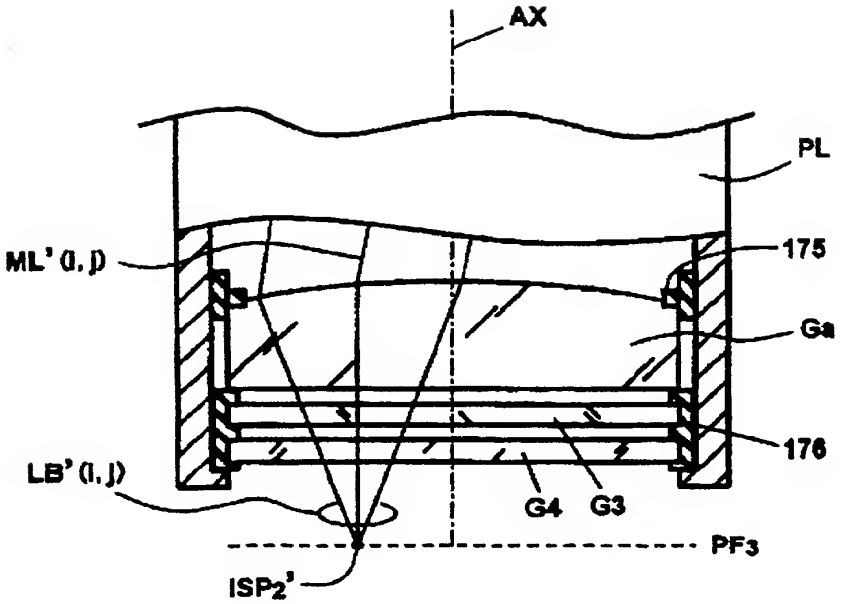


Fig. 39

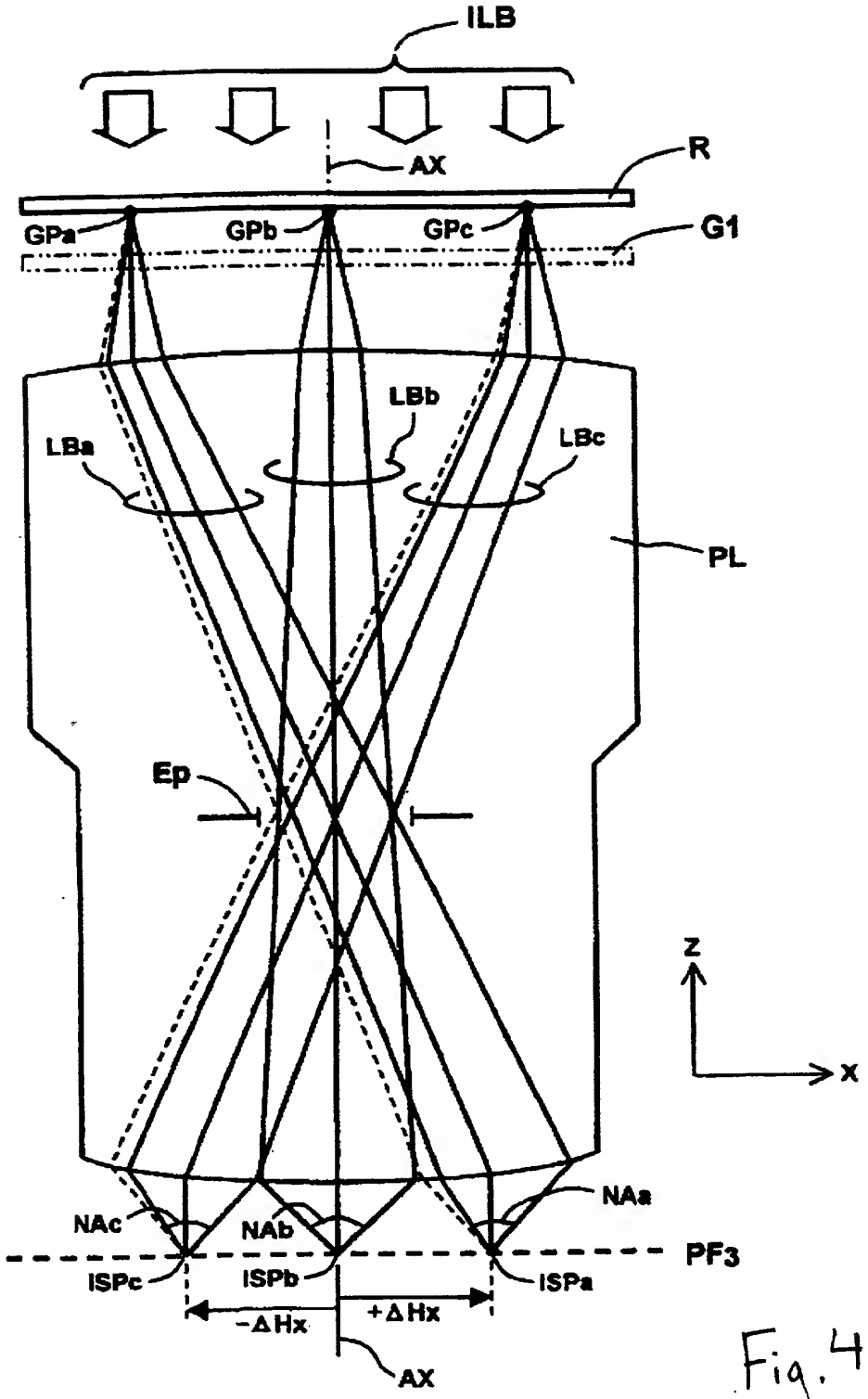

ILB
AX
R
GPa
GPb
GPc
G1
LBb
LBa
LBc
PL
Ep
z
x
NAc
NAb
NAa
PF3
ISPc
ISPb
ISPa
-ΔHx
+ΔHx
AX

Fig. 40

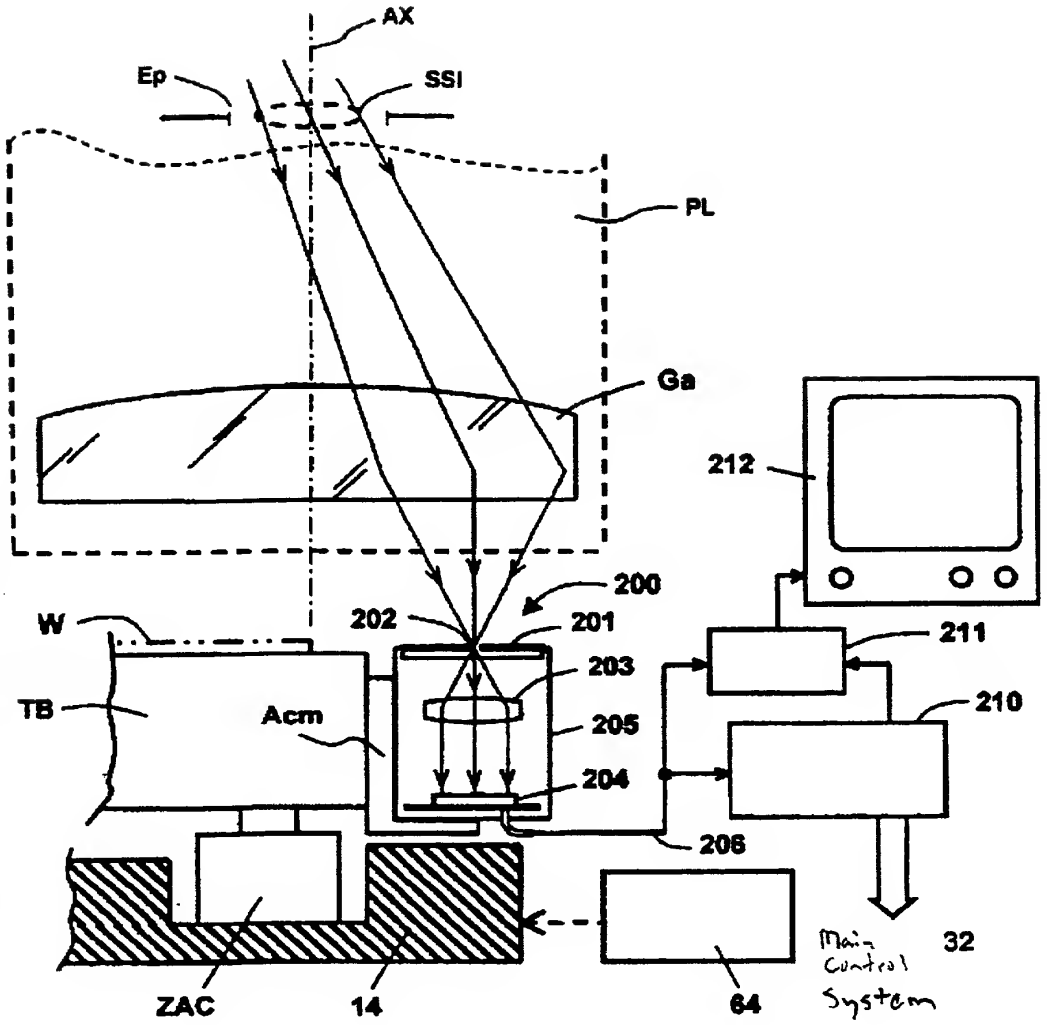

AX
Ep
SSI
PL
Ga
212
200
W
202
201
211
203
TB
Acm
210
205
204
206
32
Main Control System
ZAC
14
64

Fig. 41

Fig.42(A)

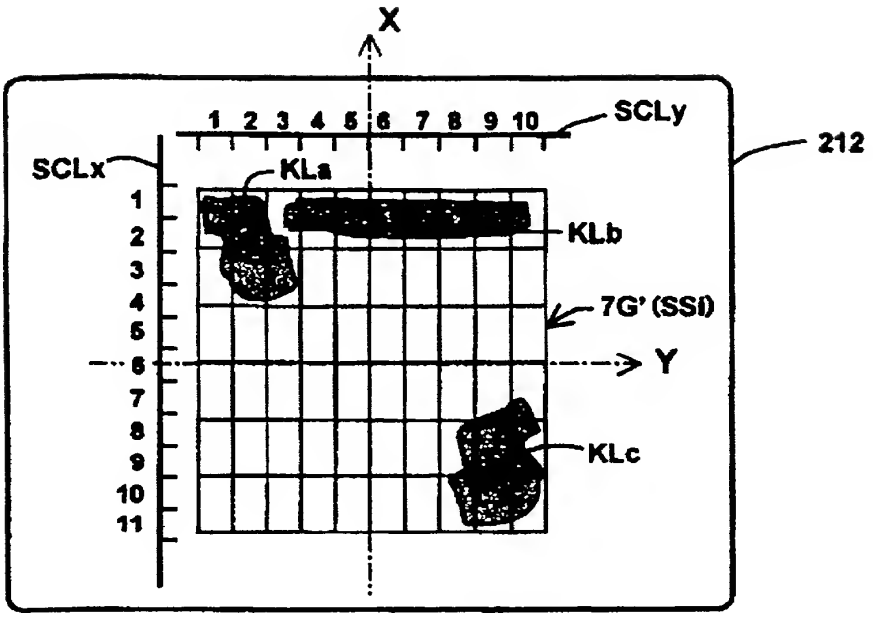
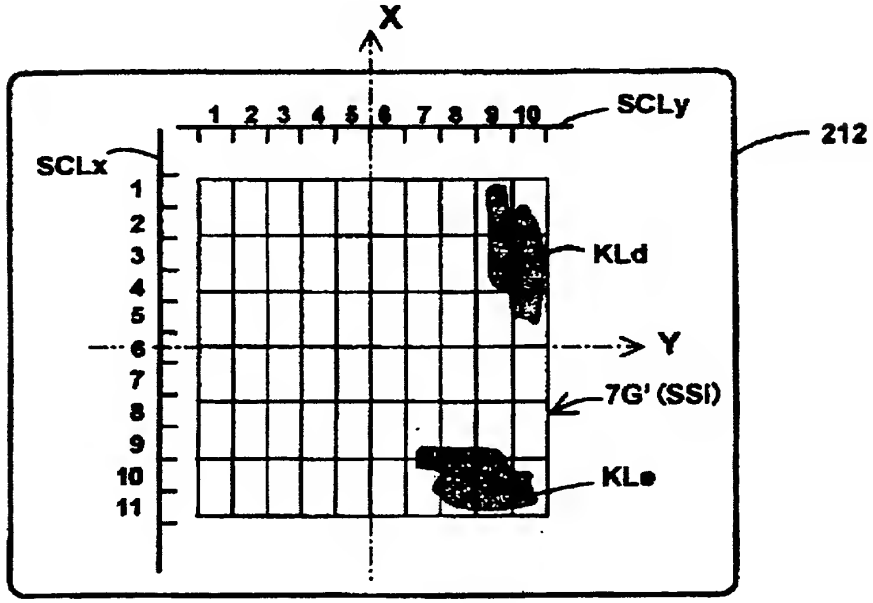


Fig.42(B)



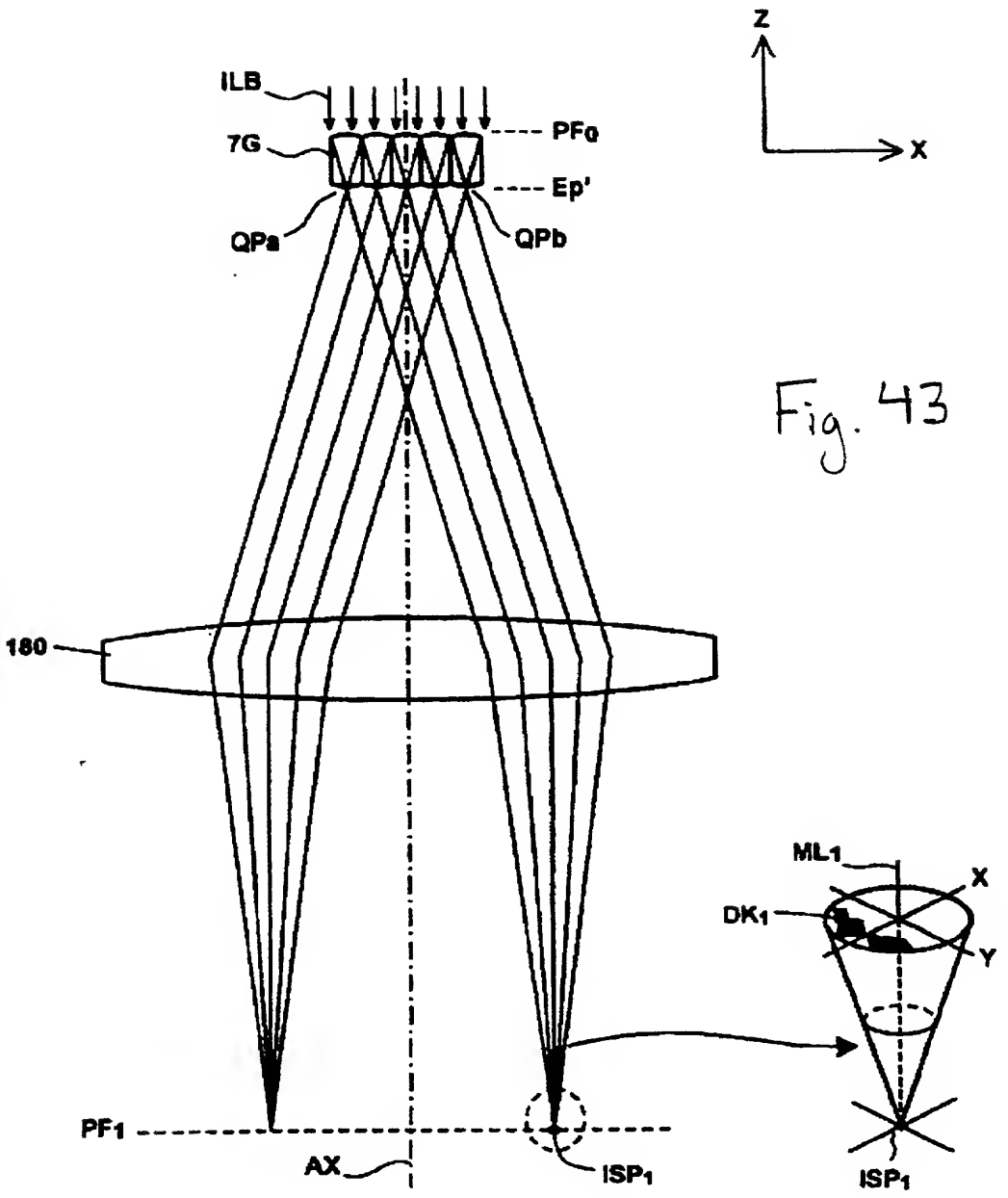


Fig. 43

Fig.44(A)

Pulse Illumination Light From First Fly-Eye Lens 7C

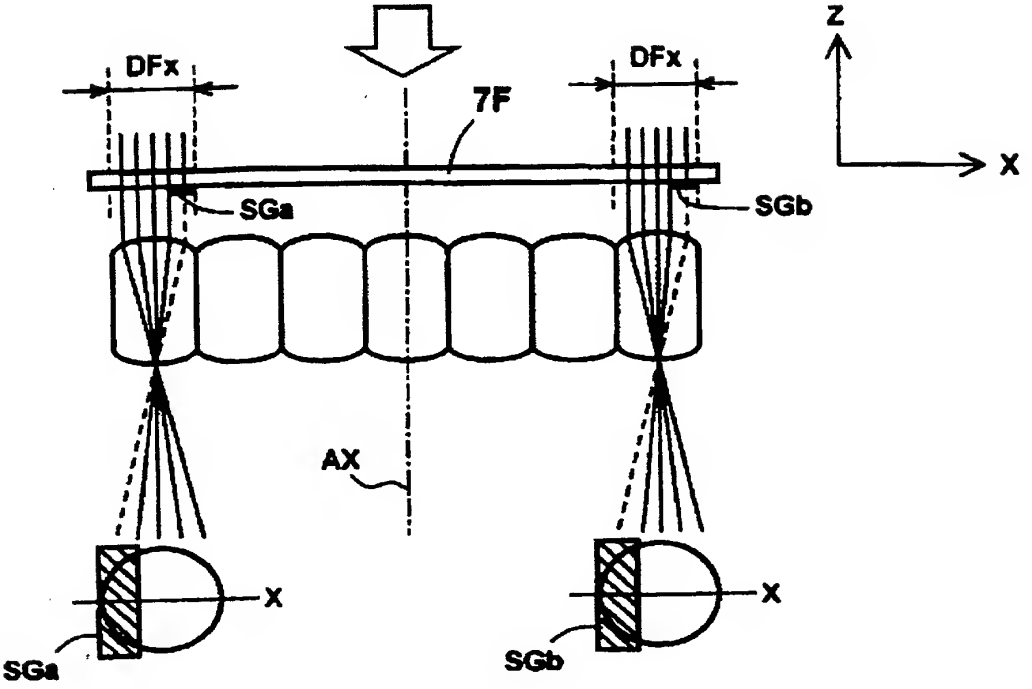
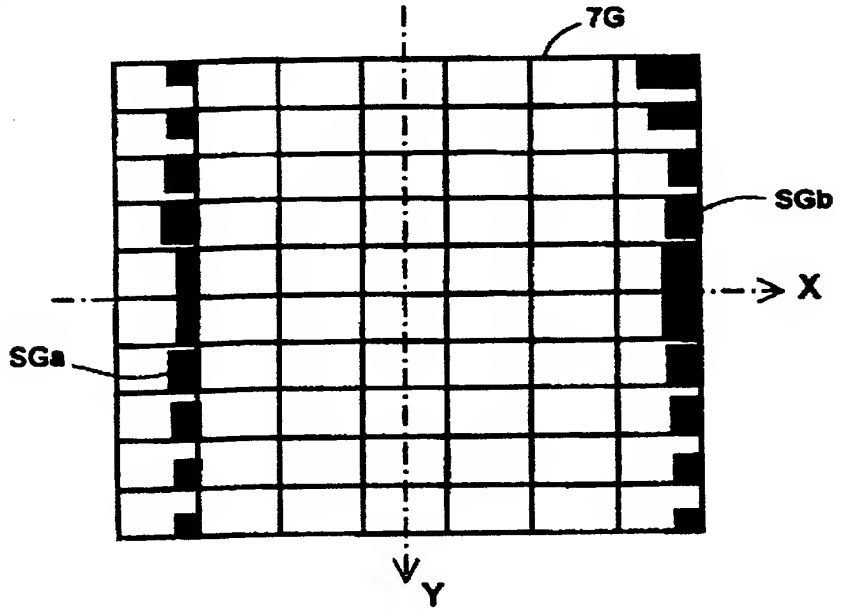


Fig.44(B)



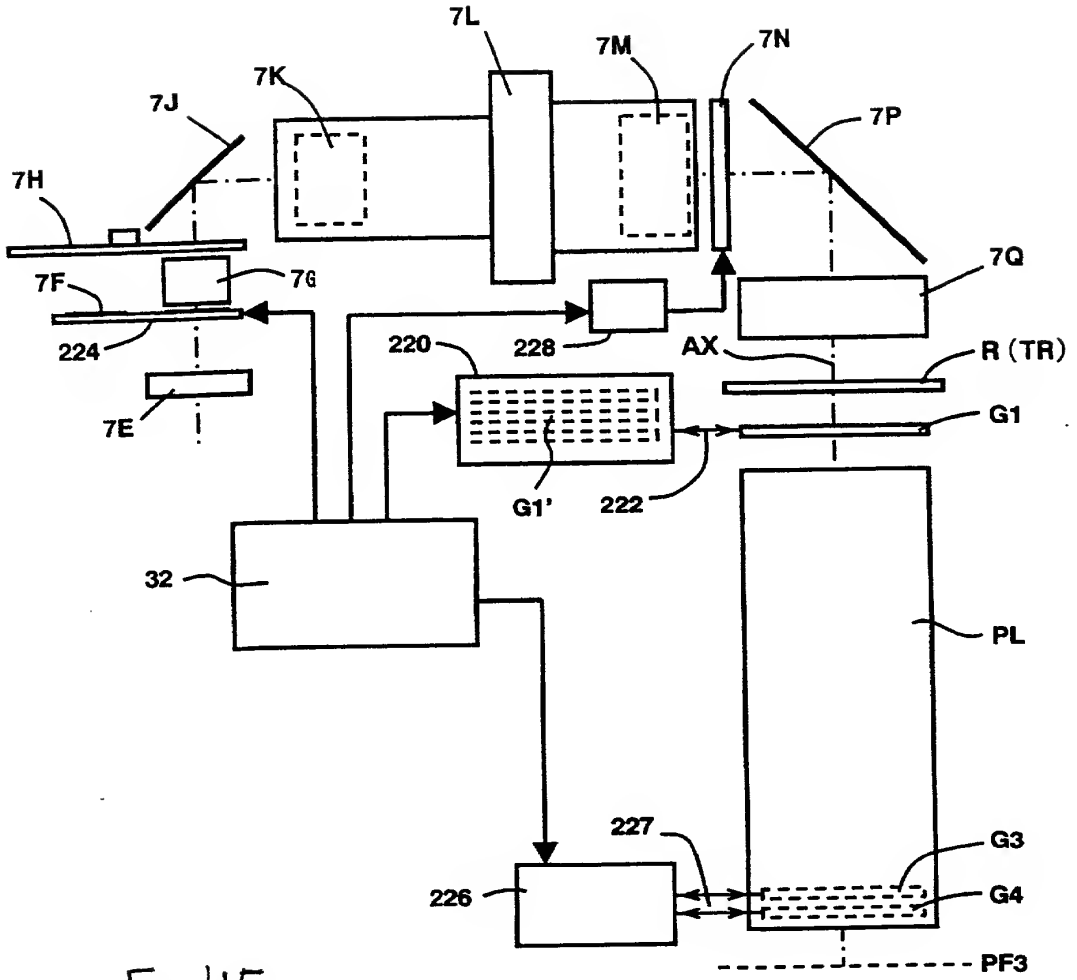

7L
7M
7N
7K
7J
7P
7H
7Q
7F
7G
224
220
228
AX
R (TR)
7E
G1
G1'
222
32
PL
227
G3
226
G4
PF3

Fig. 45

Fig.46(A)

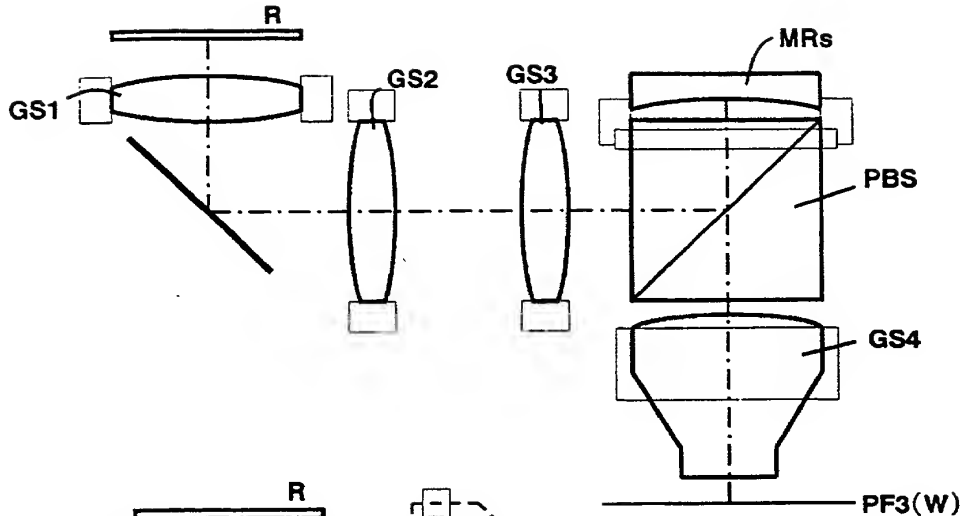


Fig.46(B)

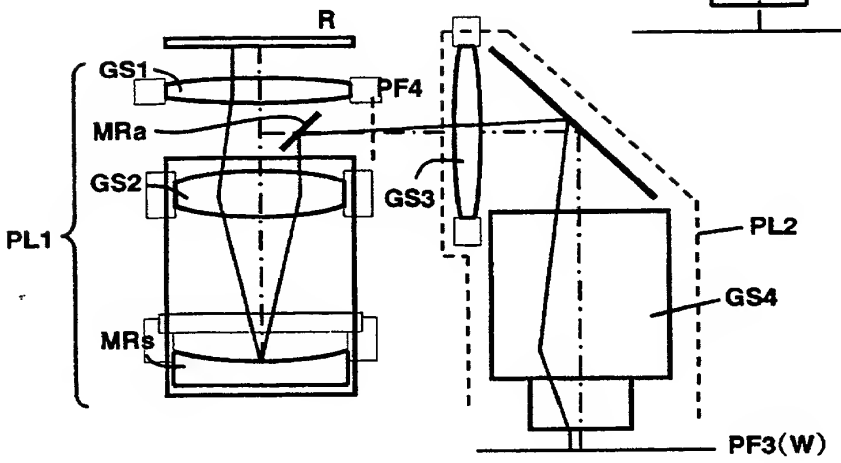
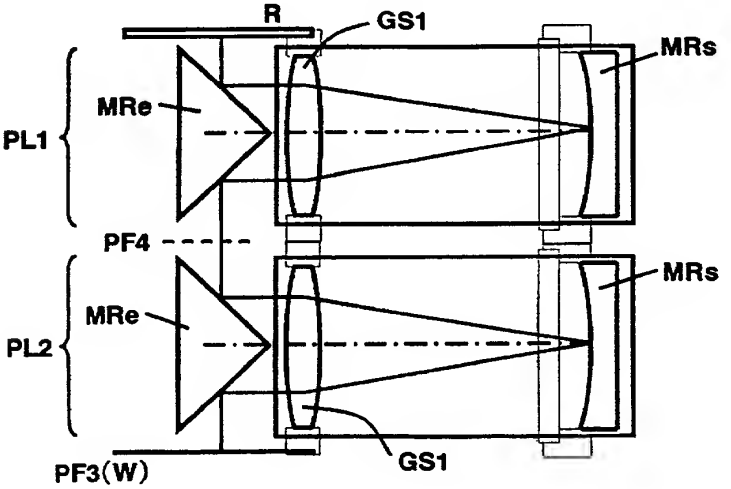


Fig.46(C)



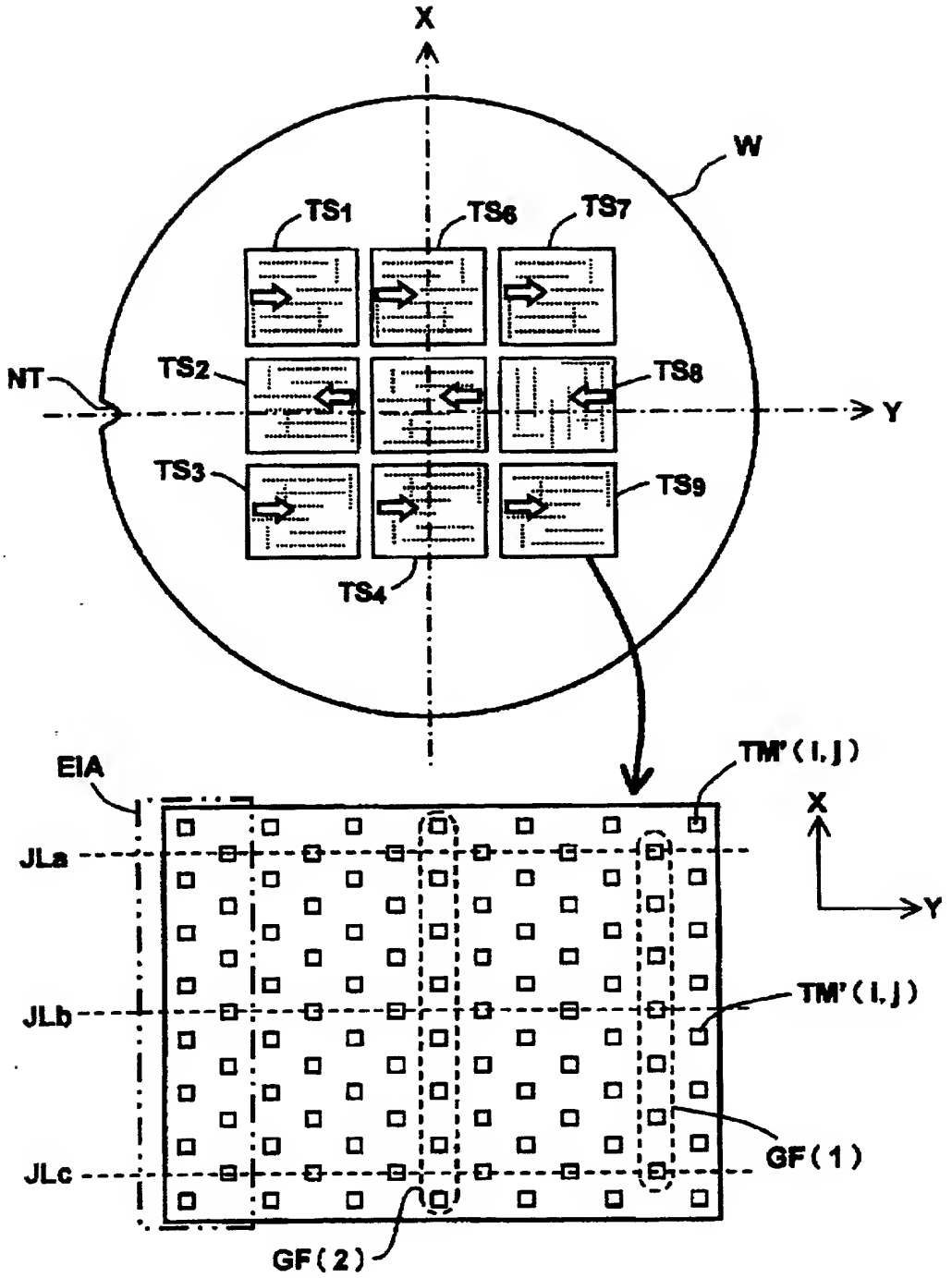

X
W
TS1
TS6
TS7
NT
TS2
TS8
Y
TS3
TS9
TS4
EIA
TM'(I,J)
X
JLa
Y
JLb
TM'(I,J)
GF(1)
JLc
GF(2)

Fig. 47

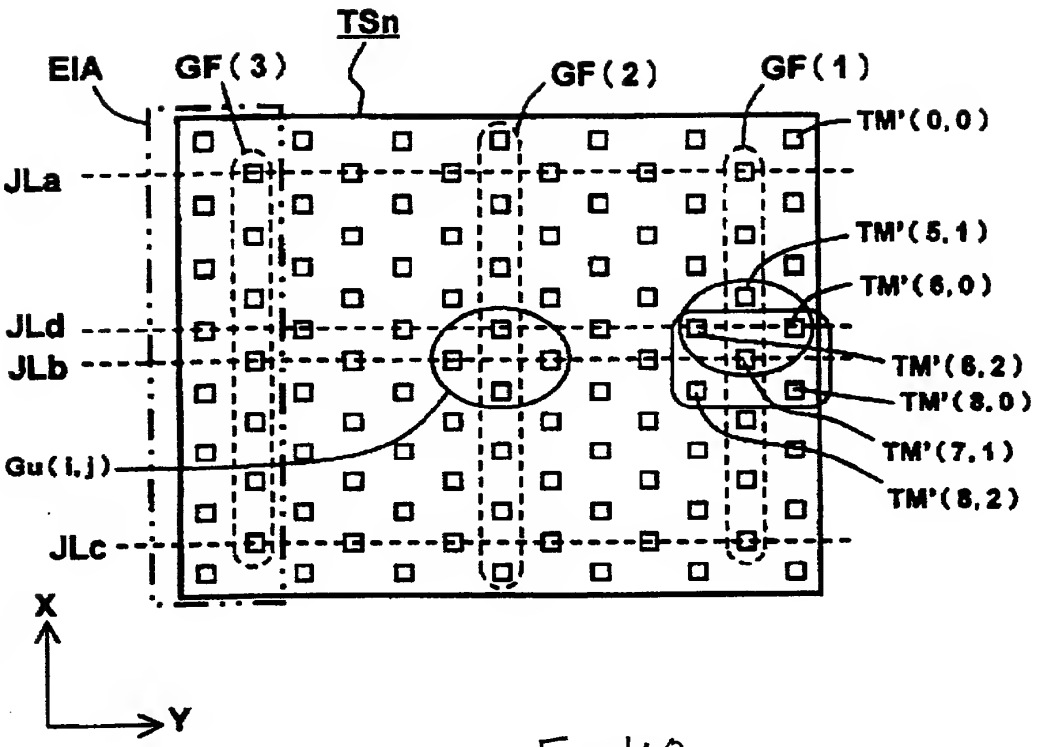

TSn
EIA
GF(3)
GF(2)
GF(1)
TM'(0,0)
JLa
TM'(5,1)
TM'(6,0)
JLd
JLb
TM'(6,2)
TM'(8,0)
TM'(7,1)
Gu(i,j)
TM'(8,2)
JLc
X
Y

Fig.48

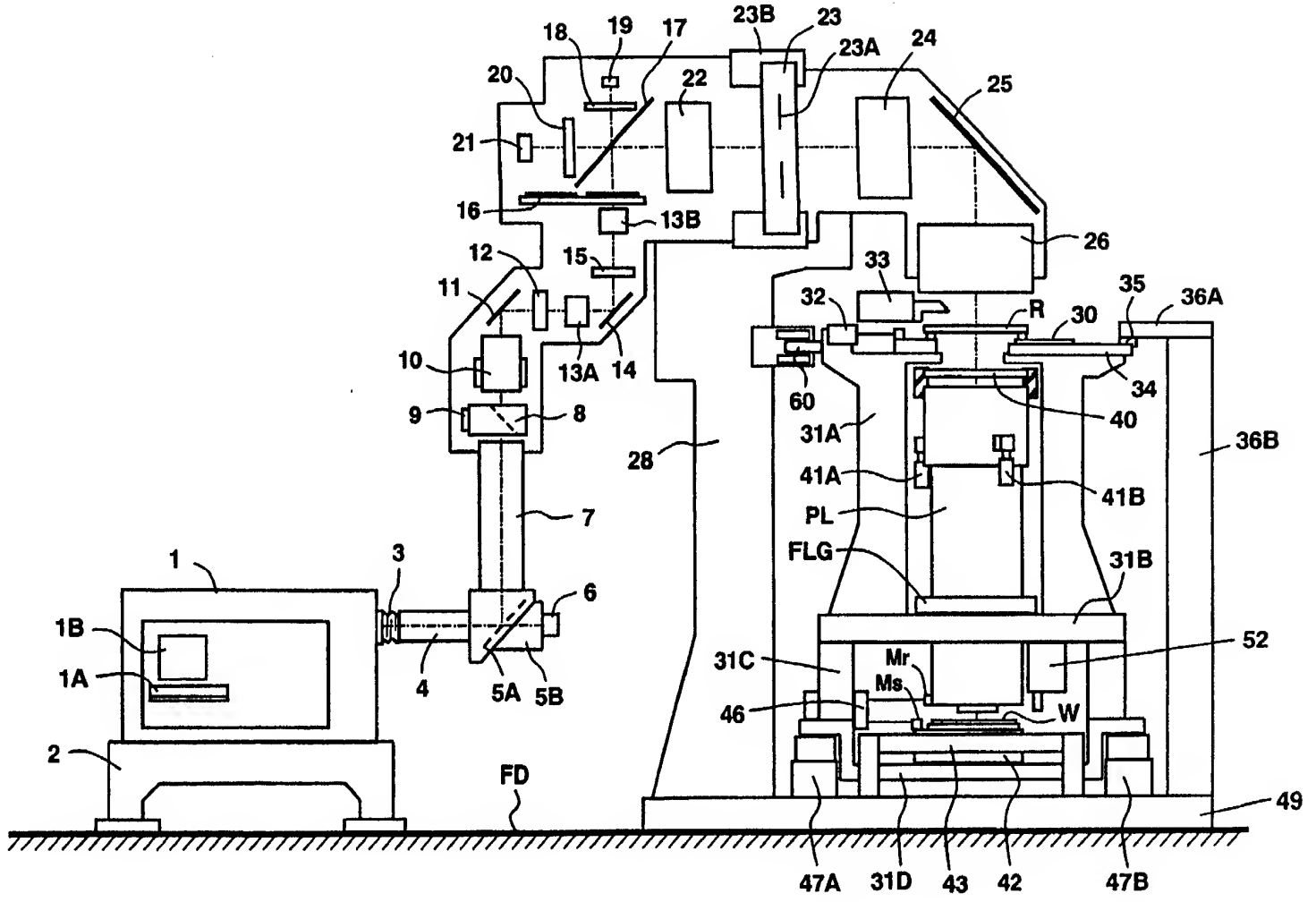


Fig. 49

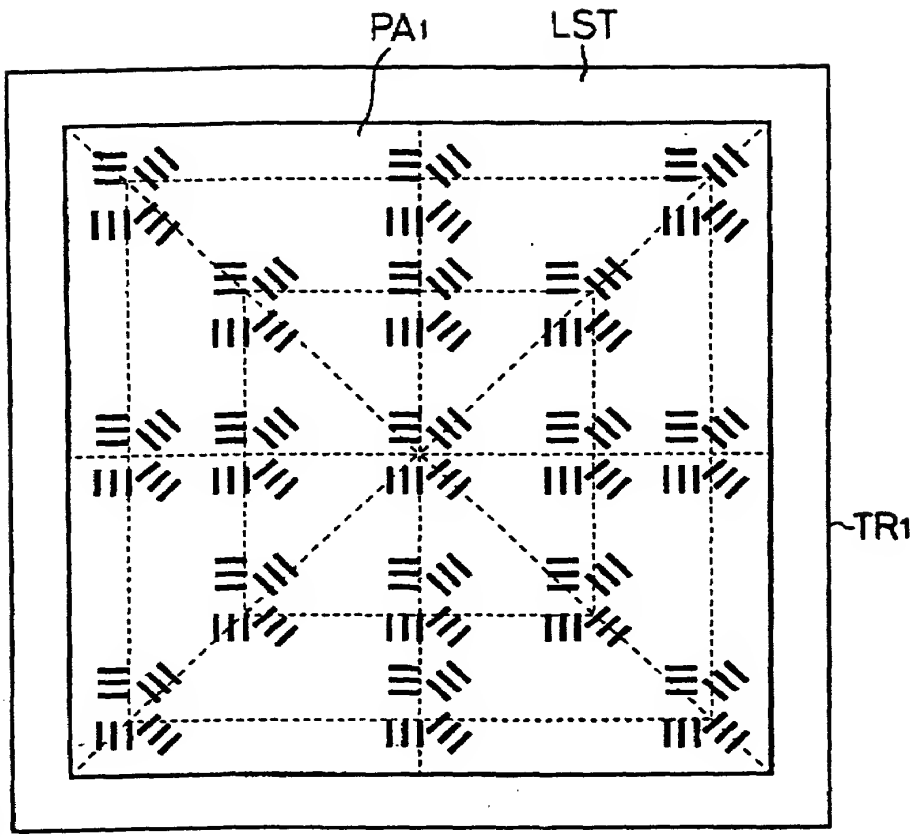
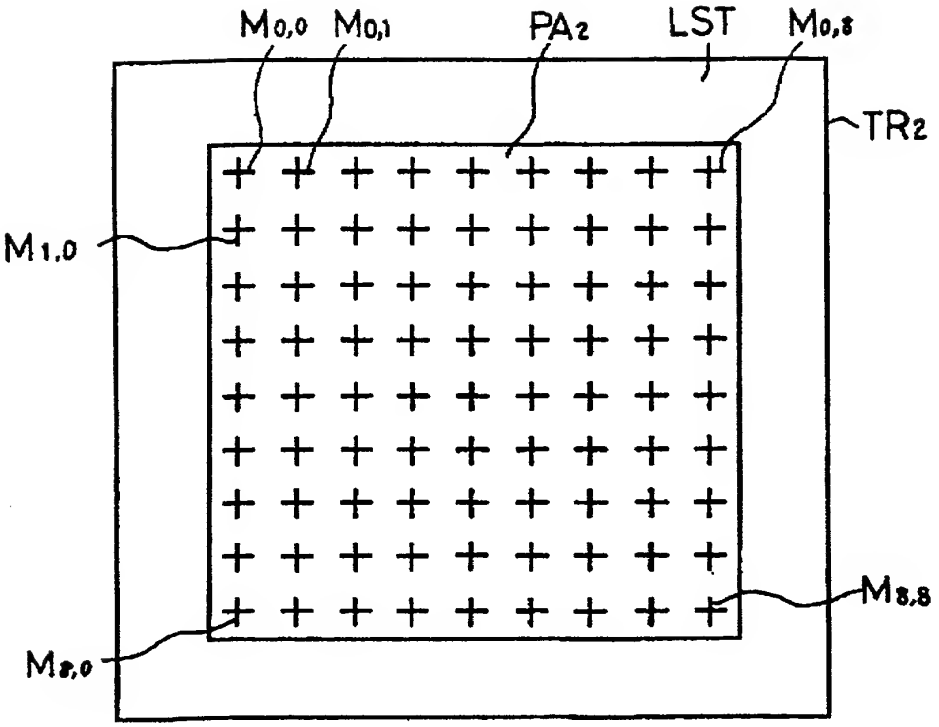


Fig. 5D



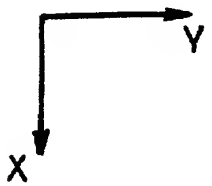


Fig. 51

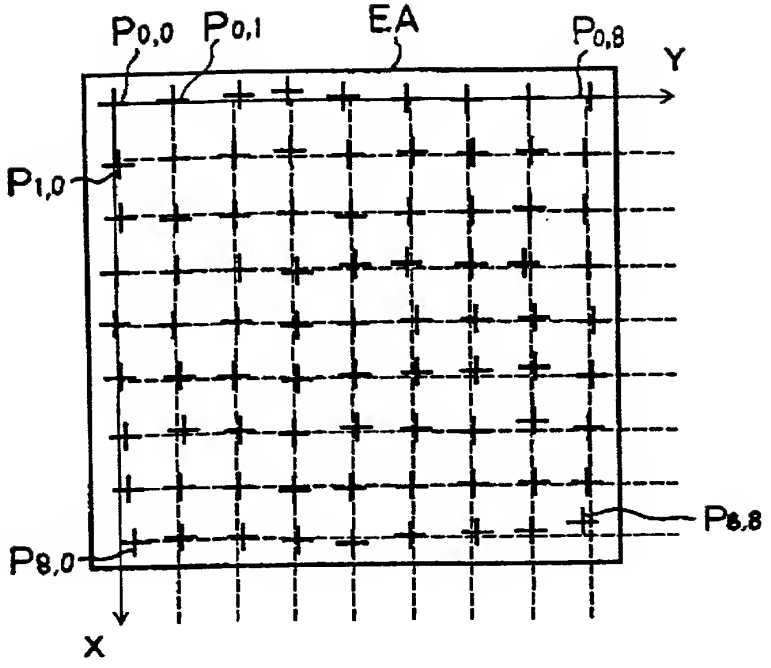


Fig.52

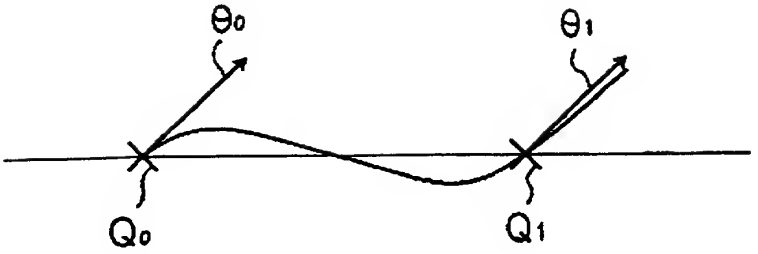


Fig.53(a)

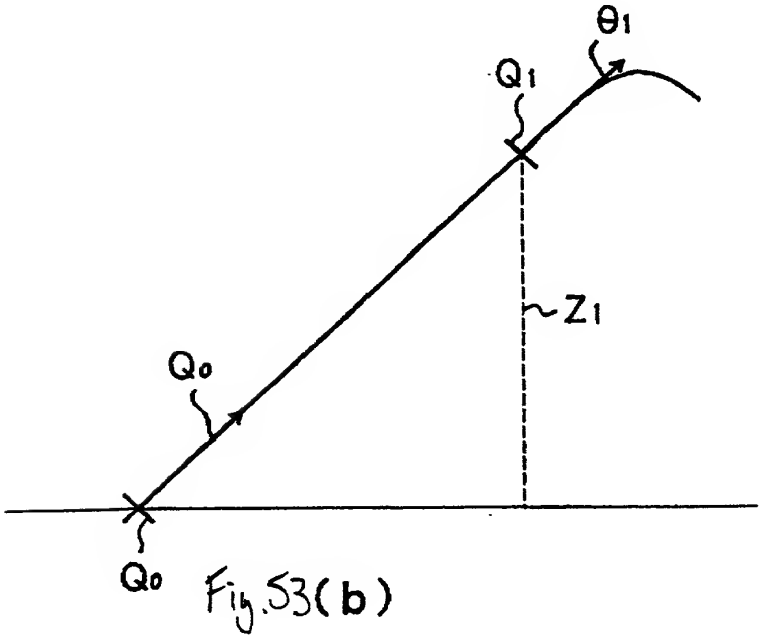
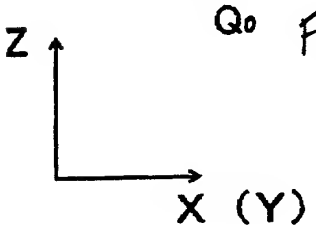


Fig.53(b)



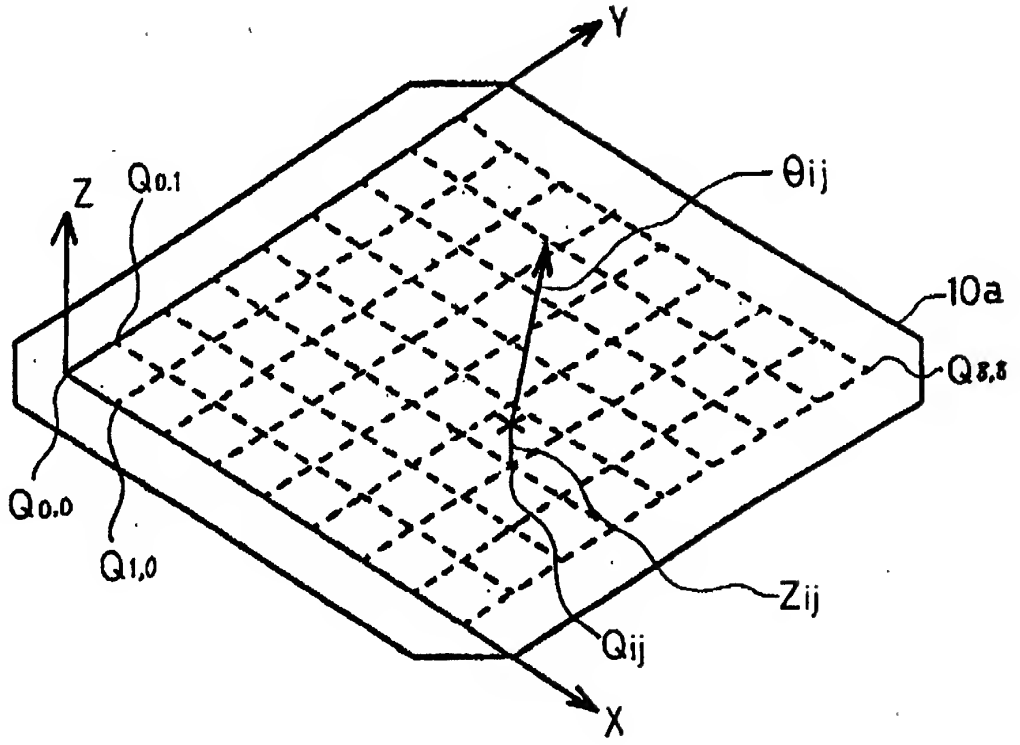


Fig. 54

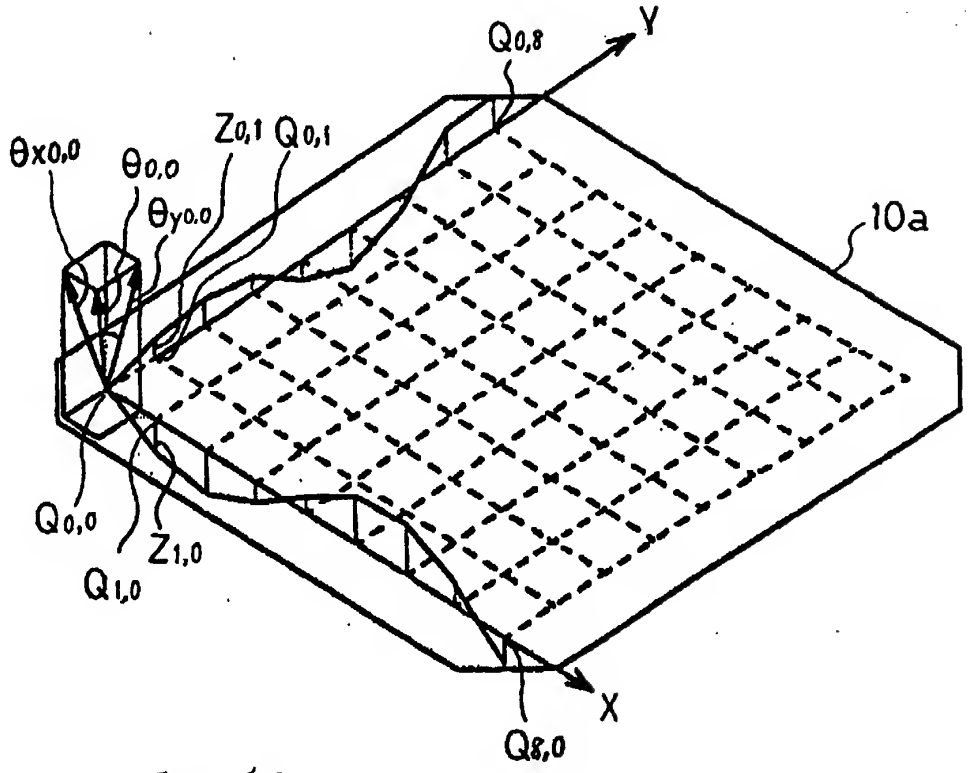


Fig.55

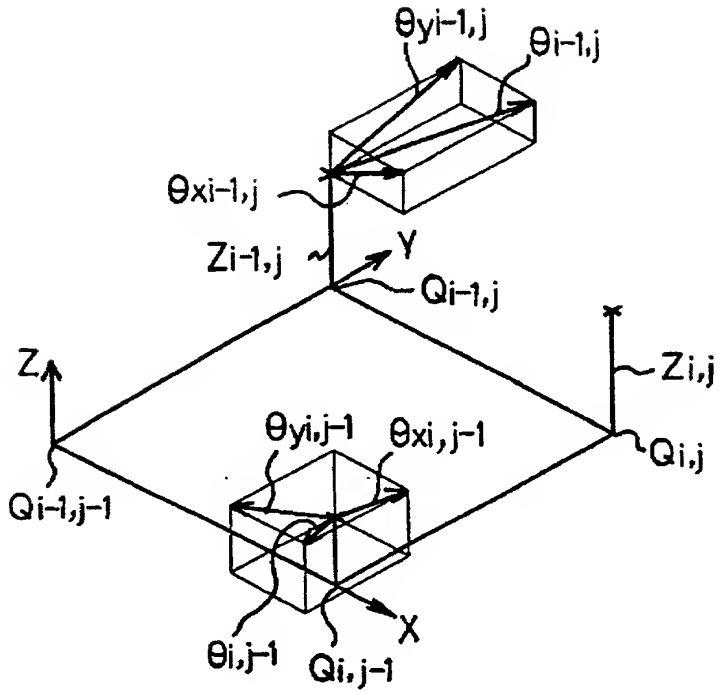

θyi-1,j
θi-1,j
θxi-1,j
Zi-1,j
Y
Qi-1,j
Z
Zi,j
θyi,j-1
θxi,j-1
Qi,j
Qi-1,j-1
X
θi,j-1
Qi,j-1

Fig. 56

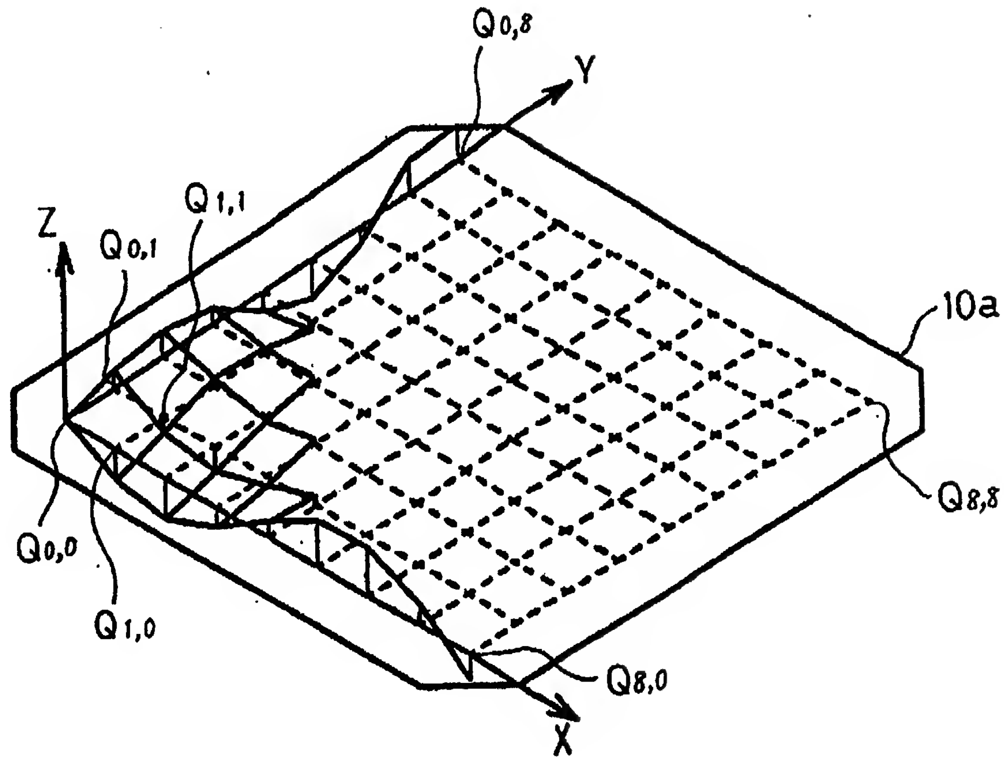


Fig. 57

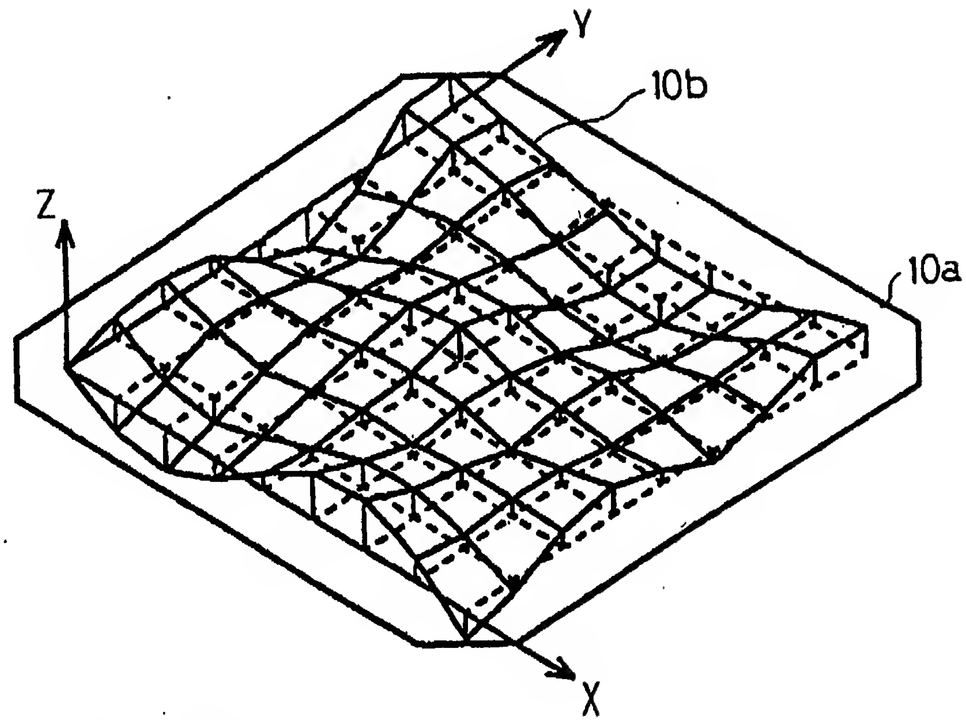


Fig.58

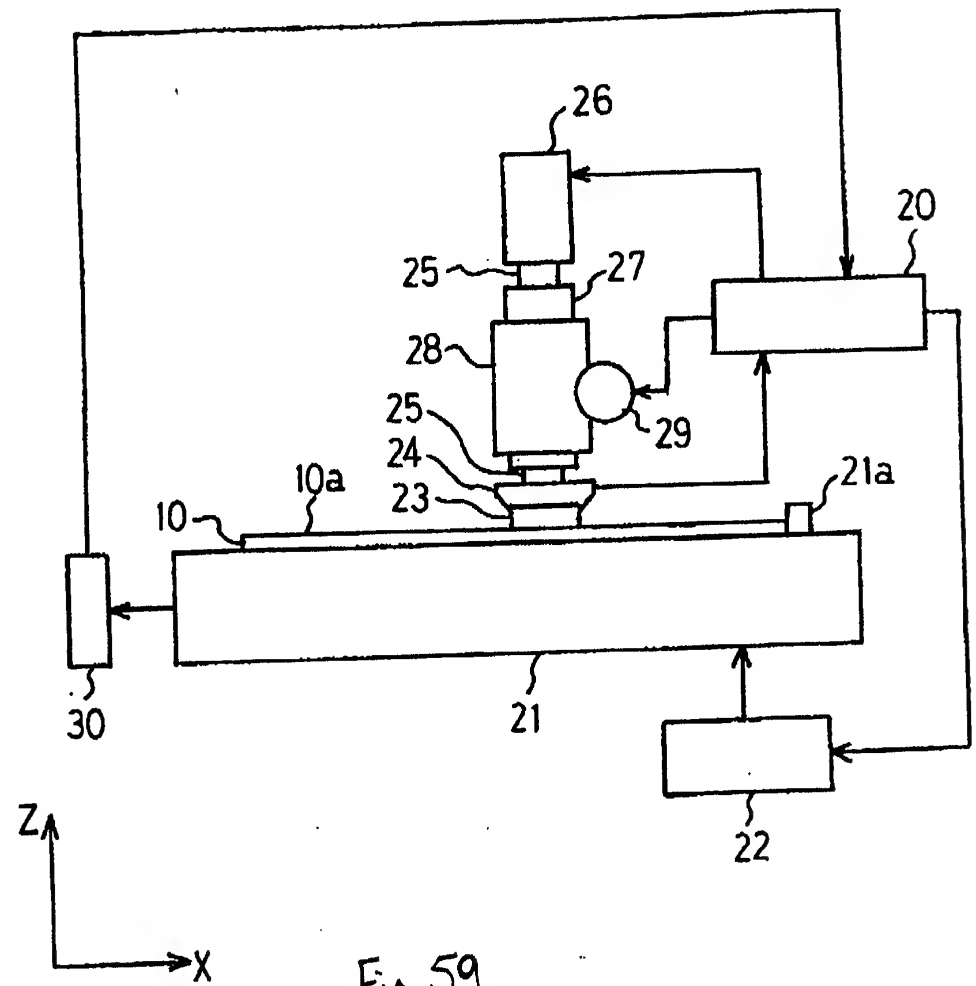


Fig. 59

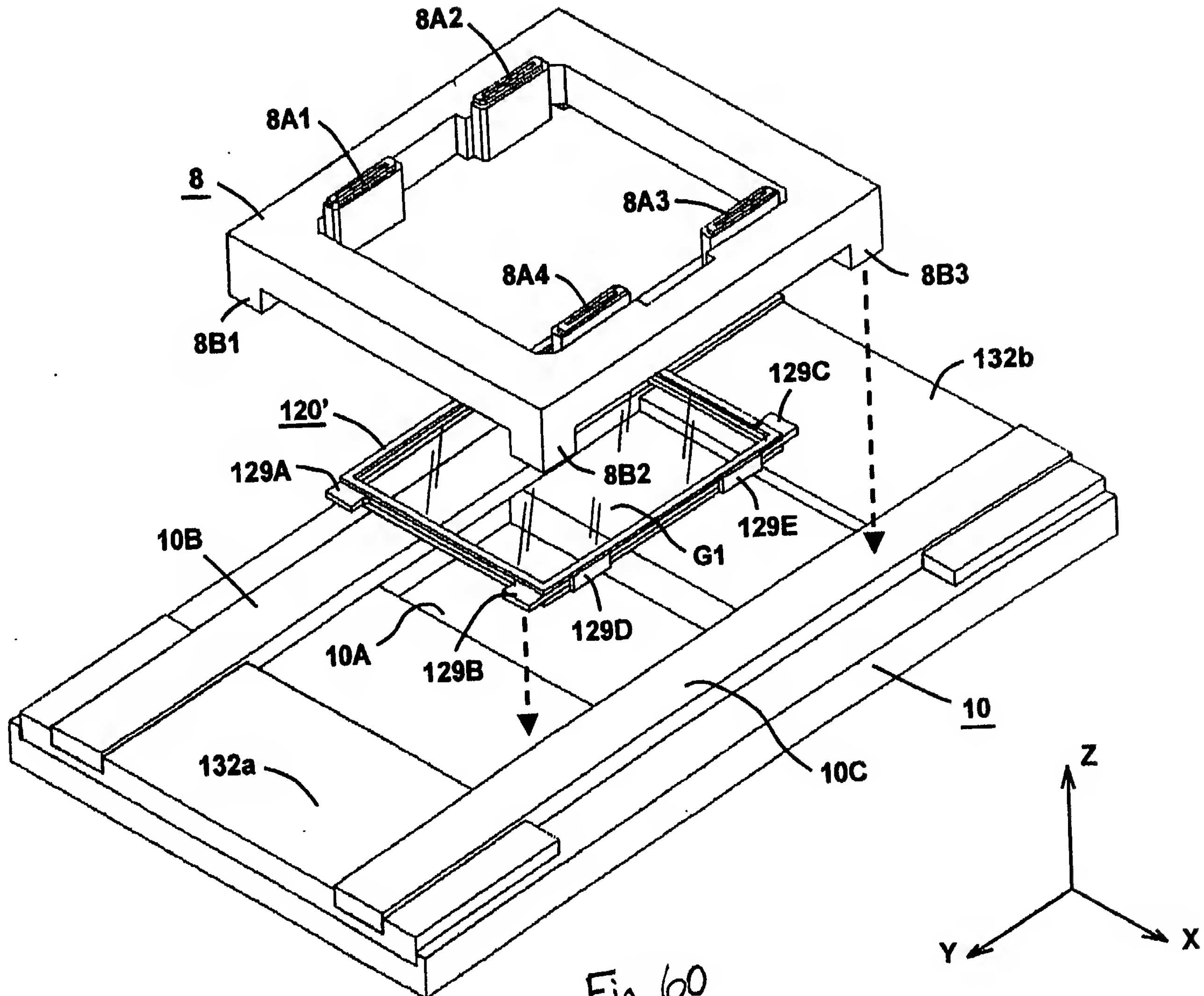


Fig. 60